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REPORT

OF THE

TESTS OF METALS

AND

OTHER MATERIALS

FOR

INDUSTRIAL PURPOSES,

MADE WITH THE

UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL, MASSACHUSETTS,

DURING

THE FISCAL YEAR ENDED JUNE 30, 1899.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A report of the commanding officer of Watertown Arsenal of "Tests of iron, steel, and other materials" made during the fiscal year ended June 30, 1899.

WAR DEPARTMENT,
Washington, January 10, 1900.

SIR: I have the honor to transmit herewith, as required by law, copy of a report of the commanding officer of the Watertown Arsenal of "Tests of iron, steel, and other materials for industrial purposes," made at that arsenal during the fiscal year ended June 30, 1899.

Very respectfully,

ELIHU ROOT, *Secretary of War.*

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WATERTOWN ARSENAL,
Watertown, Mass., January 5, 1900.

SIR: In compliance with the requirements of law I have the honor to forward herewith report of test of metals, etc., made at this arsenal during the fiscal year ending June 30, 1899.

The total number of specimens tested was 2,103, classified as follows:

Gun specimens	275
For Ordnance Department	735
For other Government Departments	4
Investigative tests	648
Tests for private parties	441
Total	2,103

The receipts and expenditures were as follows:

Amount appropriated for testing machine and testing work	$10,000.00
Received from private parties during the year	1,074.61
Total received	11,074.61
Amount expended for service and labor	7,765.92
Amount expended for light, power, tools, implements, and materials for test	3,308.69
Total expended	$11,074,61

The usual routine testing of ordnance material has been carried on by the testing department during the past fiscal year, comprising material for rapid-fire, field, siege, and seacoast guns, their mounts and carriages, and metal for small arms.

Tests have been made on steel for anchor bolts for carriages, gun-lever axles, proof stresses applied to piston rods, helical springs for mortar carriages, metal for soft-steel caps for armor-piercing shell, cast iron for gun and mortar carriages, bronze for gun mounts, cartridge brass, and other material representing current work of the Ordnance Department at this arsenal and other Government posts and stations where Government work is in progress.

Tests for private parties have been carried on as provided for by law.

In addition to these two main lines of testing, much work has been done of an investigative character on the properties of construction material, of value alike to the different branches of military and civil engineering.

There was a series of tests by hydrostatic pressure of sections over the powder chamber of .30-caliber rifle barrels.

The examination of slices of gun forgings for internal strains, introduced by cooling the metal from the surface of the bore, has been continued. These tests have been supplemented by the examination of metal from the tube of a 5-inch gun which burst under endurance trial. Internal strains thus introduced by quenching from the bore may be nearly or quite eliminated by annealing the metal, as herein shown by tests.

The concrete and mortar tests of last year have been continued and much additional data developed. The range of mixtures in both concrete and mortar has extended over such limits as would be comprised in the use of this class of material in construction. The growing importance attaching to concrete places tests of this class in an important relation to the building industries of the country. Concrete from a mixture so rich as 1 part cement to 2 parts of broken stone has been tested, and from that passing from different mixtures until the lean mixture of 1 part cement, 6 parts sand, and 12 parts broken stone was reached. Different ages of setting have been given, and diagrams accompany the details of the tests showing the gain in strength under such conditions. Mixtures have been prepared in which there has been a large excess or deficiency of mortar in proportion to the voids in the stone.

The experiments have included tests on mortar under conditions of retarded or so-called "second set," in which, by constant agitation, the cement has been kept from setting for a number of hours before being placed in the molds, where setting finally occurred. A very material loss in strength was shown to have taken place by this treatment.

When cement is set in large blocks there is a considerable rise in temperature in the mass. This was made the subject of inquiry, and the temperature of some cubes was observed over a number of hours until the maximum temperature had been reached. There was a very prompt rise of temperature observable soon after the cement was tamped into the mold, which rose slowly for about five hours, after which there was a rapid gain, reaching a maximum after nine and one-half to fifteen hours from the time of mixing.

The mixture containing the least water reached the maximum temperature earliest, and also attained the highest temperature, 200° F. in the case of a 12-inch cube.

The endurance tests of steel in the form of rotating shafts, transversely loaded, have been continued. The shafts have been run under a maximum fiber stress of 40,000 pounds per square inch. One shaft of the series has now reached 65,679,000 rotations and remains unruptured.

Interest centers on the endurance of steels under fiber stresses in the vicinity of 40,000 pounds per square inch, earlier tests having shown that many steels of high tensile properties were unable to endure repeated alternate stresses of this magnitude without rupture. With the advance in steel making the question presents itself as to how much the limit of endurance under repeated stresses has been raised, which must be answered by experiments covering the uncertain zone, or say between limits of 35,000 and 50,000 pounds per square inch.

Tests on the impact machine were inaugurated during the past year. Experiments were begun with the softer metals, lead, tin, zinc and copper, the principal series being upon lead.

The low elastic limit of lead and its great ductility makes this metal peculiarly well adapted for the early tests in an investigation on the effects of impact. The present tests show an increased resistance of flow of the metal with increased striking velocities of the falling ram. The cumulative effect of a number of short blows is greater than one blow from a height equal to the aggregate of the short blows, in this metal of low elastic limit. Thus, as an example, it was found that eighteen blows of 2 inches each produced the same effect as one blow of 56 inches on lead cylinders 1 inch diameter by 2 inches long with a 77-pound ram, and with blows of only one-half inch each this difference in effect was even greater. In these experiments the comparison is made between the total decrements in heights of the several specimens representing the total amount of work done on the metal. Obviously it is during the earlier stages of compression, while the ram has its highest velocity, that the greatest differences in resistance to flow are encountered, and the variations in resistance are therefore greater than the present comparisons can indicate.

An apparatus will be added to the impact machine in which the retardation of the falling ram will be recorded, thus enabling complete data to be obtained of the resistance encountered throughout a test.

Incidentally it was shown, in the present tests, that lead possesses the property of acquiring a temporary state of increased resistance against flow, from which there is relaxation after an interval of rest, and the total resistance is in a degree dependent upon the crystals present in the specimen. Lead cast in a slow-cooling mold, and acquiring a coarse crystalline structure, showing somewhat less resistance against impact than metal cast in a rapid-cooling mold, or after the metal had been drawn down into rods of smaller diameter in the manner employed in making lead pipe.

It was further shown that the greatest lateral flow took place in a direction parallel to the longitudinal axes of the crystals in lead, but in tin and zinc greatest flow occurred in a perpendicular direction; the blows of impact being normal to the length of the crystals.

In lead it was found that the relative rate of flow was changed after a specimen had been partially compressed and the compression renewed

after an interval of time. The disparity in the direction of flow was lessened, relatively greater flow now occurring in a direction perpendicular to the axes of the crystals, the elongation in lengthwise direction still leading, however.

Chemical analyses are recorded in the different grades of cast iron and steel, which are found in the body of the report.

A contract has been made for a smaller testing machine, of the Emery type, one of 200,000 pounds range, for tension and compression, to be delivered during the present fiscal year.

This machine will relieve the larger one of much of the routine testing, expediting work, and economizing time, heretofore necessarily taken in arranging the larger machine for all classes of work.

The testing department may now be considered nearly complete, with respect to its equipment. There is but $10,000 appropriated annually for material and labor of all kinds. This is the same amount as was appropriated the first year of its existence, while the work of the department has expanded fourfold. With an increased appropriation more skilled operators can be employed, and all the equipment kept in constant use. Instead of one operator we need four, and there is ample work for all.

It may be well to repeat here, for the benefit of the public at large, that private parties can have tests made upon their defraying the costs, which amount to $2.75 per hour; this is the law. The report of such tests is private property, and not made known to any but the parties ordering them.

My thanks are due to Mr. J. E. Howard, C. E., in charge of testing department, for his valuable work. Its accuracy and reliability has never been questioned.

Very respectfully, your obedient servant,

J. W. REILLY,
Lieut. Col., Ordnance Department, U. S. A., Commanding.

The CHIEF OF ORDNANCE, U. S. A.,
Washington, D. C.

REPORT

OF THE

TESTS OF METALS AND OTHER MATERIALS

FOR

INDUSTRIAL PURPOSES,

MADE WITH THE

UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL, MASSACHUSETTS,

DURING

THE FISCAL YEAR ENDED JUNE 30, 1899.

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6-POUNDER R. F. GUNS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6080.

Marks, $\frac{A}{M_2}$ 70-6 T
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001350	.000200	.....	.....	
8,400	42,000	.001450	.000100	0.	.....	
10,000	50,000	.001650	.000200	.....	.....	
10,200	51,000	.001700	.000050	.....	.....	
10,400	52,000	.001750	.000050	.....	.....	
10,600	53,000	.001800	.000050	.....	.....	
10,800	54,000	.001850	.000050	.....	.....	
11,000	55,000	.001900	.000050	.....	.....	Elastic limit.
11,200	56,000	.009000	.007100	.....	.....	
11,400	57,000	.010150	.001150	.....	.....	
11,600	58,000	.011000	.000850	.....	.....	
11,800	59,000	.012000	.001000	.....	.....	
12,000	60,000	.013000	.001000	.....	.....	
18,310	91,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,550
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2950
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		".95 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".16, ".43*

TUBE.

No. 6115.

Marks, $\frac{A\ 114\text{-}6\ T}{M_1}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001200	.000200	.....	.....	
8,000	40,000	.001400	.000200	.....	.....	
8,400	42,000	.001450	.000050	0.	.....	
10,000	50,000	.001700	.000250	.....	.....	
11,000	55,000	.001950	.000250	.....	.....	
11,200	56,000	.002000	.000050	.....	.....	Elastic limit.
11,400	57,000	.006750	.004750	.....	.....	
11,600	58,000	.010000	.003250	.....	.....	
11,800	59,000	.011850	.001850	.....	.....	
12,000	60,000	.012850	.001000	.....	.....	
12,200	61,000	.013750	.000900	.....	.....	
17,720	88,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,600
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.3000
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section	do...	59.8
Position of rupture		1″.2 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.35*, ″.25

TUBE.

No. 6116.

Marks, $\frac{A\ 116\text{-}6\ T}{M_1}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001200	.000200	0.	.....	
8,000	40,000	.001400	.000200	.....	.....	
8,400	42,000	.001450	.000050	0.	.....	
10,000	50,000	.001650	.000200	.....	.....	
11,200	56,000	.001950	.000800	.....	.....	
11,400	57,000	.002000	.000050	.....	.....	Elastic limit.
11,600	58,000	.010000	.008000	.....	.....	
11,800	59,000	.011000	.001000	.....	.....	
12,000	60,000	.011850	.000850	.....	.....	
12,200	61,000	.012900	.001050	.....	.....	
12,400	62,000	.014000	.001100	.....	.....	
18,020	90,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,100
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.2850
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		59.8
Position of rupture		1" from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".16, ".41*

JACKET.

No. 6075.

Marks, $\frac{A\ 52\text{-}6\ J}{M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
8,000	40,000	.001200	.000250	0.	.....	
9,200	46,000	.001450	.000250	0.	.....	
11,000	55,000	.001900	.000450	.....	.....	
11,200	56,000	.001950	.000050	.....	.....	
11,400	57,000	.002000	.000050	.....	.....	
11,600	58,000	.002000	0.	.....	.....	
11,800	59,000	.002050	.000050	.....	.....	Elastic limit.
12,000	60,000	.002500	.000450	.....	.....	
12,200	61,000	.003650	.001150	.....	.....	
12,400	62,000	.008400	.004750	.....	.....	
12,600	63,000	.009000	.000600	.....	.....	
12,800	64,000	.010500	.001500	.....	.....	
18,150	90,750	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,750
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.28*

JACKET.

No. 6082.

Marks, $\frac{A\ 82-6\ J}{M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
8,000	40,000	.001300	.000350	0.	.....	
9,200	46,000	.001550	.000250	0.	.....	
10,000	50,000	.001650	.000100	.....	.....	
10,200	51,000	.001700	.000050	.....	.....	
10,400	52,000	.001750	.000050	.....	.....	
10,600	53,000	.001750	0.	.....	.....	
10,800	54,000	.001800	.000050	.....	.....	Elastic limit.
11,000	55,000	.002000	.000200	.....	.....	
11,200	56,000	.003150	.001150	.....	.....	
11,400	57,000	.003950	.000800	.....	.....	
11,600	58,000	.005000	.001050	.....	.....	
11,800	59,000	.006000	.001000	.....	.....	
18,980	94,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of orginal section	pounds..	94,900
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".55 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".32*

JACKET.

No. 6135.

Marks, $\frac{A-113-6\ J}{M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001350	.000200	.....	.....	
8,400	42,000	.001400	.000050	0.	.....	
9,200	46,000	.001500	.000100	0.	.....	
10,000	50,000	.001600	.000100	.....	.....	
10,200	51,000	.001650	.000050	.....	.....	
10,400	52,000	.001700	.000050	.....	.....	
10,600	53,000	.001750	.000050	.....	.....	Elastic limit.
10,800	54,000	.001950	.000200	.....	.....	
11,000	55,000	.002300	.000350	.....	.....	
11,200	56,000	.003400	.001100	.....	.....	
11,400	57,000	.005000	.001600	.....	.....	
11,600	58,000	.007750	.002750	.....	.....	
18,240	91,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,200
Elastic limit per square inch of original section	do...	58,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".19, ".26*

JACKET.

No. 6136.

Marks, $\frac{A}{B}$ 121-6 J
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001350	.000200	.....	.....	
8,400	42,000	.001400	.000050	0.	.....	
9,200	46,000	.001500	.000100	0.	.....	
9,800	49,000	.001600	.000100	.....	.....	Elastic limit.
10,000	50,000	.001800	.000200	.....	.....	
10,200	51,000	.002350	.000550	.....	.....	
10,400	52,000	.002900	.000550	.....	.....	
10,600	53,000	.003600	.000700	.....	.....	
10,800	54,000	.004650	.001050	.....	.....	
11,000	55,000	.005500	.000850	.....	.....	
19,120	95,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,600
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.1550
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".55 from neck
Character of broken surface		fine granular, flaky spot at the circumference
Elongation of inch sections		".21*, ".10

TABULATION OF TENSION SPECIMENS FROM 6-POUNDER R. F. GUNS.
(STEMS 2" LONG, ".505 DIAMETER.)

No. of test.	Position in gun.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
		Pounds.	*Pounds.*	*Per ct.*	*Per ct.*		
6080	Tube	55,000	91,550	29.5	57.2	Fine silky, cup shaped.....	Mussle end.
6115	...do	56,000	88,600	30.0	59.8	.....do.....	Do.
6116	...do	57,000	90,100	28.5	59.8	.....do.....	Do.
6075	Jacket ...	59,000	90,750	21.5	46.2	Silky.....	Do.
6082	...do	54,000	94,900	21.5	46.2	.....do.....	Do.
6135	...do	58,000	91,200	22.5	49.1	.....do.....	Do.
6136	...do	49,000	95,600	15.5	20.5	Fine granular, flaky spot at the circumference.	Breech end.

3-INCH R. F. GUNS.

SPECIMENS FROM TUBES, JACKETS, AND HOOPS.

TUBE.

No. 6022.

Marks, A–30–M_2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001450	.000300	.....	.....	
8,400	42,000	.001500	.000050	0.	.....	
10,000	50,000	.001850	.000350	.....	.....	
10,200	51,000	.001900	.000050	.....	.....	
10,400	52,000	.001950	.000050	.....	.....	
10,600	53,000	.002000	.000050	.....	.....	
10,800	54,000	.002000	.000050	.....	.....	
11,000	55,000	.002050	0.	.....	.....	
11,200	56,000	.002100	.000050	.....	.....	
11,400	57,000	.002200	.000100	.....	.....	
11,600	58,000	.002300	.000100	.....	.....	Elastic limit.
11,800	59,000	.002650	.000350	.....	.....	
12,000	60,000	.008000	.005350	.....	.....	
12,200	61,000	.008900	.000900	.....	.....	
12,400	62,000	.010150	.001250	.....	.....	
12,600	63,000	.011500	.001350	.....	.....	
17,960	89,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,800
Elastic limit per square inch of original section	do...	58,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002300
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		″8 from neck
Character of broken surface		silky
Elongation of inch sections		″.10, ″.30*

TUBE.

No. 6023.

Marks, A–31–M_2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
7,000	35,000	.001300	.000300	0.	.....	
8,000	40,000	.001450	.000150	.....	.....	
8,400	42,000	.001500	.000050	0.	.....	
10,000	50,000	.001900	.000400	.....	.....	
10,200	51,000	.001950	.000050	.....	.....	
10,400	52,000	.002000	.000050	.....	.....	Elastic limit.
10,600	53,000	.002350	.000350	.....	.....	
10,800	54,000	.002950	.000600	.....	.....	
11,000	55,000	.007000	.004050	.....	.....	
11,200	56,000	.010000	.003000	.....	.....	
11,400	57,000	.011000	.001000	.....	.....	
17,640	88,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,200
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch...	.2500
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		at middle of stern
Character of broken surface		silky
Elongation of inch sections		".26*, ".24*

TUBE.

No. 6074.

Marks, $\frac{A\ 50\text{-}3\ T}{B_1}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001100	.000100	0.	.....	
8,000	40,000	.001300	.000200	.....	.....	
8,400	42,000	.001400	.000100	0.	.....	
10,000	50,000	.001650	.000250	.....	.....	
10,200	51,000	.001700	.000050	.....	.....	
10,400	52,000	.001750	.000050	.....	.....	
10,600	53,000	.001800	.000050	.....	.....	
10,800	54,000	.001850	.000050	.....	.....	
11,000	55,000	.001900	.000050	.....	.....	
11,200	56,000	.001950	.000050	.....	.....	
11,400	57,000	.002000	.000050	.....	.....	Elastic limit.
11,600	58,000	.002400	.000400	.....	.....	
11,800	59,000	.004250	.001850	.....	.....	
12,000	60,000	.009500	.005250	.....	.....	
12,200	61,000	.010350	.000850	.....	.....	
12,400	62,000	.011500	.001150	.....	.....	
17,660	88,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,300
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".95 from neck
Character of broken surface		silky
Elongation of inch sections		".10, ".85

TUBE.

No. 6081.

Marks, $\frac{A\ 78\text{-}3\ T}{M_1}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001400	.000250	.....	.....	
8,400	42,000	.001500	.000100	0.	.....	
10,000	50,000	.001750	.000250	.....	.....	
10,200	51,000	.001800	.000050	.....	.....	
10,400	52,000	.001850	.000050	.....	.....	
10,600	53,000	.001900	.000050	.....	.....	
10,800	54,000	.001950	.000050	.....	.....	
11,000	55,000	.002000	.000050	.....	.....	
11,200	56,000	.002000	0.	.....	.....	Elastic limit.
11,400	57,000	.002600	.000600	.....	.....	
11,600	58,000	.003350	.000750	.....	.....	
11,800	59,000	.004500	.001150	.....	.....	
12,000	60,000	.006750	.002250	.....	.....	
12,200	61,000	.007750	.001000	.....	.....	
19,320	96,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,600
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.1850
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		1" from neck
Character of broken surface		granular 60 per cent, silky flaky 40 per cent
Elongation of inch sections		".24, ".13

JACKET.

No. 6082.

Marks, $\frac{A\ 82\text{-}6\ J}{M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
8,000	40,000	.001300	.000350	0.	.....	
9,200	46,000	.001550	.000250	0.	.....	
10,000	50,000	.001650	.000100	.....	.....	
10,200	51,000	.001700	.000050	.....	.....	
10,400	52,000	.001750	.000050	.....	.....	
10,600	53,000	.001750	0.	.....	.....	
10,800	54,000	.001800	.000050	.....	.....	Elastic limit.
11,000	55,000	.002000	.000200	.....	.....	
11,200	56,000	.003150	.001150	.....	.....	
11,400	57,000	.003950	.000800	.....	.....	
11,600	58,000	.005000	.001050	.....	.....	
11,800	59,000	.006000	.001000	.....	.....	
18,980	94,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of orginal section	pounds..	94,900
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".55 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".32*

TUBE.

No. 6187.

Marks, $\frac{A\ 128\text{-}3\ T}{B_1}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001250	.000100	.....	.....	
8,400	42,000	.001350	.000100	0.	.....	
10,000	50,000	.001650	.000800	.....	.....	
10,200	51,000	.001650	0.	.....	.....	
10,400	52,000	.001700	.000050	.....	.....	
10,600	53,000	.001750	.000050	.....	.....	Elastic limit.
10,800	54,000	.005000	.003250	.....	.....	
11,000	55,000	.010000	.005000	.....	.....	
11,200	56,000	.011000	.001000	.....	.....	
11,400	57,000	.011650	.000650	.....	.....	
11,600	58,000	.013000	.001350	.....	.....	
17,180	85,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,900
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1".1 from neck
Character of broken surface		fine silky
Elongation of inch sections		".18, ".35*

TUBE.

No. 6138.

Marks, $\frac{A\ 122\text{-}3'\ T}{B_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000850	.....	.....	
6,000	30,000	.000950	.000850	.....	.....	
7,000	35,000	.001100	.000150	.....	.....	
8,000	40,000	.001200	.000100	.....	.....	
8,400	42,000	.001300	.000100	.....	.....	
10,000	50,000	.001600	.000800	.....	.....	
10,200	51,000	.001650	.000050	.....	.....	
10,400	52,000	.001650	0.	.....	.....	
10,600	53,000	.001700	.000050	.....	.....	
10,800	54,000	.001750	.000050	.....	.....	
11,000	55,000	.001850	.000100	.....	.....	Elastic limit.
11,200	56,000	.005500	.003650	.....	.....	
11,400	57,000	.008250	.002750	.....	.....	
11,600	58,000	.011000	.002750	.....	.....	
11,800	57,000	.012550	.001550	.....	.....	
12,000	60,000	.014250	.001700	.....	.....	
17,260	86,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,300
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2350
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".7 from neck
Character of broken surface		fine silky
Elongation of inch sections		".10, ".87*

TUBE.

No. 6149.

Marks, $\frac{A\ 143\text{-}3\ T}{B_2}$
Diameter, ".500.
Sectional area, .196 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
196	1,000	0.	0.	0.	0.	Initial load.
980	5,000	.000100	.000100	0.	.....	
1,960	10,000	.000200	.000100	.....	.....	
3,920	20,000	.000600	.000400	.....	.....	
5,880	30,000	.001000	.000400	.....	.....	
6,860	35,000	.001150	.000150	0.	.....	
7,840	40,000	.001300	.000150	.....	.....	
8,232	42,000	.001450	.000150	0.	.....	
8,428	43,000	.001450	0.	.....	.....	
8,624	44,000	.001500	.000050	.....	.....	
8,820	45,000	.001550	.000050	.....	.....	
9,016	46,000	.001600	.000050	.....	.....	
9,212	47,000	.001600	0.	.....	.....	
9,408	48,000	.001650	.000050	.....	.....	
9,604	49,000	.001650	0.	.....	.....	
9,800	50,000	.001700	.000050	.....	.....	
9,996	51,000	.001700	0.	.....	.....	
10,192	52,000	.001750	.000050	.....	.....	
10,388	53,000	.001800	.000050	.....	.....	
10,584	54,000	.001800	0.	.....	.....	
10,780	55,000	.001900	.000100	.....	.....	
10,976	56,000	.002000	.000100	.....	.....	Elastic limit.
11,172	57,000	.002300	.000300	.....	.....	
11,368	58,000	.003600	.001300	.....	.....	
11,564	59,000	.006000	.002400	.....	.....	
11,760	60,000	.009000	.003000	.....	.....	
11,956	61,000	.010250	.001250	.....	.....	
18,320	93,470	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	93,470
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		42.1
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		#.20*, #.23*

TUBE.

No. 6179.

Marks, $\frac{A-161-3\ T}{B_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
4,000	20,000	.000600	.000400	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001400	.000250	.....	.....	
8,400	42,000	.001450	.000050	0.	.....	
8,600	43,000	.001500	.000050	.....	.....	
8,800	44,000	.001550	.000050	.....	.....	
9,000	45,000	.001600	.000050	.....	.....	Elastic limit.
9,200	46,000	.015500	.013900	.....	.....	
9,400	47,000	.016750	.001250	.....	.....	
9,600	48,000	.018000	.001250	.....	.....	
9,800	49,000	.019050	.001050	.....	.....	
10,000	50,000	.020600	.001550	.....	.....	
15,510	77,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,550
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2600
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".9 from neck
Character of broken surface		silky, serrated
Elongation of inch sections		".16, ".36*

TUBE.

No. 6180.

Marks, $\frac{A\text{-}164\text{-}3\ T}{B_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001450	.000300	.....	.....	
8,400	42,000	.001500	.000050	0.	.....	
8,600	43,000	.001550	.000050	.....	.....	Elastic limit.
8,800	44,000	.012250	.010700	.....	.....	
9,000	45,000	.013700	.001450	.....	.....	
9,200	46,000	.015100	.001400	.....	.....	
9,400	47,000	.016600	.001500	.....	.....	
9,600	48,000	.017600	.001000	.....	.....	
15,620	78,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,100
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.2650
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1".04 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".18, ".35*

TUBE.

No. 6855.

Marks, $\frac{A-78-3\ T}{B_4}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001400	.000250	.....	.....	
8,400	42,000	.001450	.000050	0.	.....	
10,000	50,000	.001850	.000400	.....	.....	
10,200	51,000	.001900	.000050	.....	.....	Elastic limit.
10,400	52,000	.002300	.000400	.....	.....	
10,600	53,000	.004300	.002000	.....	.....	
10,800	54,000	.005850	.001050	.....	.....	
11,000	55,000	.006000	.000650	.....	.....	
11,200	56,000	.007250	.001250	.....	.....	
18,320	91,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,600
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		".9 from neck
Character of broken surface		silky
Elongation of inch sections		".12, ".31*

TUBE.

No. 6356.

Marks, $\frac{A\ 215\text{-}3\ T}{B\ J_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001100	.000150	0.	.....	
8,000	40,000	.001400	.000300	.....	.....	
8,400	42,000	.001450	.000050	.....	.....	
10,000	50,000	.001700	.000250	.....	.....	
10,200	51,000	.001750	.000050	.....	.....	
10,400	52,000	.001800	.000050	.....	.....	Elastic limit.
10,600	53,000	.005600	.003800	.....	.....	
10,800	54,000	.007150	.001550	.....	.....	
11,000	55,000	.008750	.001600	.....	.....	
11,200	56,000	.011500	.002750	.....	.....	
11,400	57,000	.013250	.001750	.....	.....	
17,320	86,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,600
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2800
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".85 from neck
Character of broken surface		silky
Elongation of inch sections		".12, ".34*

JACKET.

No. 6073.

Marks, $\frac{A}{M}$ 47-3 J
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
8,000	40,000	.001300	.000350	0.	.....	
9,200	46,000	.001500	.000200	.....	.....	
10,000	50,000	.001700	.000200	.....	.....	
10,200	51,000	.001750	.000050	.....	.....	
10,400	52,000	.001800	.000050	.....	.....	
10,600	53,000	.001900	.000100	.....	.....	
10,800	54,000	.001950	.000050	.....	.....	
11,000	55,000	.002000	.000050	.....	.....	
11,200	56,000	.002050	.000050	.....	.....	Elastic limit.
11,400	57,000	.002200	.000150	.....	.....	
11,600	58,000	.006500	.004300	.....	.....	
11,800	59,000	.007500	.001000	.....	.....	
12,000	60,000	.008950	.001450	.....	.....	
12,200	61,000	.010000	.001050	.....	.....	
18,040	90,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,200
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		".95 from neck
Character of broken surface		silky
Elongation of inch sections		".28*, ".13

JACKET.

No. 6117.

Marks, $\frac{A\ 20-3\ J}{B\ T}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001400	.000400	0.	.....	
9,200	46,000	.001600	.000200	0.	.....	
10,800	54,000	.002000	.000400	.....	.....	Elastic limit.
11,000	55,000	.011000	.009000	.....	.....	
11,200	56,000	.011900	.000900	.....	.....	
11,400	57,000	.012450	.000550	.....	.....	
11,600	58,000	.013500	.001050	.....	.....	
11,800	59,000	.015000	.001500	.....	.....	
16,770	83,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,850
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		1".2 from neck
Character of broken surface		granular, radiating from a silky flaky spot at circumference
Elongation of inch sections		".30", ".16

JACKET.

No. 6162.

Marks, $\frac{A-137-3J}{M_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000200	.000150	.....	.....	
4,000	20,000	.000550	.000350	.....	.....	
6,000	30,000	.001000	.000450	.....	.....	
8,000	40,000	.001400	.000400	0.	.....	
9,200	46,000	.001550	.000150	0.	.....	
9,400	47,000	.001600	.000050	.....	.....	
9,600	48,000	.001650	.000050	.....	.....	
9,800	49,000	.001700	.000050	.....	.....	
10,000	50,000	.001700	0.	.....	.....	
10,200	51,000	.001750	.000050	.....	.....	
10,400	52,000	.001800	.000050	.....	.....	
10,600	53,000	.001850	.000050	.....	.....	Elastic limit.
10,800	54,000	.004000	.002150	.....	.....	
11,000	55,000	.007500	.003500	.....	.....	
11,200	56,000	.009500	.002000	.....	.....	
11,400	57,000	.010700	.001200	.....	.....	
11,600	58,000	.011750	.001050	.....	.....	
17,310	86,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,550
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".17,".35*

JACKET.

No. 6163.

Marks, $\frac{A\ 151\text{-}3\ J}{M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001400	.000400	0.	.....	
9,200	46,000	.001550	.000150	0.	.....	
9,400	47,000	.001550	0.	.....	.....	
9,600	48,000	.001600	.000050	.....	.....	
9,800	49,000	.001650	.000050	.....	.....	
10,000	50,000	.001650	0.	.....	.....	
10,200	51,000	.001700	.000050	.....	.....	
10,400	52,000	.001750	.000050	.....	.....	
10,600	53,000	.001800	.000050	.....	.....	Elastic limit.
10,800	54,000	.002000	.000200	.....	.....	
11,000	55,000	.003500	.001500	.....	.....	
11,200	56,000	.005750	.002250	.....	.....	
11,400	57,000	.007050	.001300	.....	.....	
11,600	58,000	.008250	.001200	.....	.....	
18,300	91,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,500
Elastic limit per square inch of original section	do...	58,000
Elongation per inch after rupture	inch..	.2450
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".30*, ".19

Hoop.

No. 6072.

Marks, $\frac{A\ 54\text{-}3\ H}{B_1}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001350	.000350	.....	.....	
9,000	45,000	.001500	.000150	0.	.....	
10,000	50,000	.001650	.000150	0.	.....	
11,000	55,000	.001900	.000250	.....	.....	Elastic limit.
11,200	56,000	.002650	.000750	.....	.....	
11,400	57,000	.012550	.009900	.....	.....	
11,600	58,000	.013800	.001250	.....	.....	
12,000	60,000	.015950	.002150	.....	.....	
17,020	85,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,100
Elastic limit, per square inch of original section	do..	55,000
Elongation per inch after rupture	inch..	.2350
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		".6 from neck
Character of broken surface		silky
Elongation of inch sections		".36*, ".11

TABULATION OF TENSION SPECIMENS FROM 3-INCH R. F. GUNS.
(STEMS 2″ LONG, .″505 DIAMETER.)

No. of test.	Position in gun.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
		Pounds.	*Pounds.*	*Pr. ct.*	*Pr. ct.*		
6022	Tube	56,000	89,300	20.0	43.8	Silky.....	Muzzle end.
6023	.....do	52,000	88,200	25.0	49.1	.....do.....	Do.
6074	.....do	57,000	88,300	21.0	46.2	.....do.....	Breech end.
6081	.....do	56,000	96,600	18.5	34.0	Granular, 60 per cent; silky flaky, 40 per cent.	Muzzle end.
6114	.....do	58,000	88,200	8.0	9.5	Fine granular, radiating from a flaky spot at circumference.	Breech end.
6137	.....do	58,000	85,900	24.0	49.1	Fine silky.....	Do.
6138	.....do	55,000	86,300	23.5	46.2	.....do.....	Do.
6149	.....do	56,000	93,470	21.5	42.1	Silky.....	Do.
6179	.....do	45,000	77,550	26.0	46.2	Silky, serrated	Do.
6180	.....do	43,000	78,100	26.5	46.2	Silky, oblique.....	Do.
6355	.....do	51,000	91,600	21.5	43.3	Silky.....	Do.
6356	.....do	52,000	86,600	23.0	46.2	.....do	Do.
6073	Jacket....	56,000	90,200	20.5	37.1	.....do	Muzzle end.
6117	.....do	54,000	83,850	23.0	30.7	Granular, radiating from a silky flaky spot at circumference.	Breech end.
6162	.....do	53,000	86,550	26.0	46.2	Silky.....	Muzzle end.
6163	.....do	53,000	91,500	24.5	46.2	.....do.....	Do.
6072	Hoop	55,000	85,100	23.5	51.9	.....do.....	Breech end.

3.2-INCH B. L. STEEL FIELD GUNS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6014.

Marks, $\frac{11261\ B_3\ F_2}{M\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
7,000	35,000	.001100	.000150	0.	.....	
8,000	40,000	.001350	.000250	.....	.....	
8,400	42,000	.001450	.000100	0.	.....	
9,200	46,000	.001550	.000100	.....	.....	
9,400	47,000	.001600	.000050	.....	.....	
9,600	48,000	.001600	0.	.....	.....	
9,800	49,000	.001650	.000050	.....	.....	Elastic limit.
10,000	50,000	.002150	.000500	.....	.....	
10,200	51,000	.003500	.001350	.....	.....	
10,400	52,000	.006500	.003000	.....	.....	
10,600	53,000	.007650	.001150	.....	.....	
10,800	54,000	.008400	.000750	.....	.....	
18,180	90,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	90,900
Elastic limit, per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent. of original section		43.3
Position of rupture		".9 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".31*, ".14

TUBE.

No. 6095.

Marks, $\frac{11251\ B_3\ F_2}{B\ T_cM}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	0.	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
7,000	35,000	.001100	.000150	0.	.....	
8,000	40,000	.001300	.000200	.....	.....	
8,400	42,000	.001400	.000100	0.	.....	
8,600	43,000	.001450	.000050	.....	.....	
8,800	44,000	.001450	0.	.....	.....	
9,000	45,000	.001500	.000050	.....	.....	
9,200	46,000	.001500	0.	.....	.....	
9,400	47,000	.001550	.000050	.....	.....	
9,600	48,000	.001600	.000050	.....	.....	
9,800	49,000	.001650	.000050	.....	.....	Elastic limit.
10,000	50,000	.001800	.000150	.....	.....	
10,200	51,000	.002800	.001000	.....	.....	
10,400	52,000	.004000	.001200	.....	.....	
10,600	53,000	.005000	.001000	.....	.....	
10,800	54,000	.005900	.000900	.....	.....	
19,020	95,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,100
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		".7 from neck
Character of broken surface		granular, radiating from a silky spot in the circumference
Elongation of inch sections		".28*, ".15

TUBE.

No. 6127.

Marks, $\frac{11261}{M}\ \frac{B_2}{T_1}\ \frac{F_1}{M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	.....	.....	
2,000	10,000	.000300	.000150	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001100	.000150	.....	.....	
8,000	40,000	.001300	.000200	.....	.....	
8,400	42,000	.001450	.000150	.....	.....	
8,600	43,000	.001450	0.	.....	.....	
8,800	44,000	.001500	.000050	.....	.....	
9,000	45,000	.001550	.000050	.....	.....	
9,200	46,000	.001550	0.	.....	.....	
9,400	47,000	.001600	.000050	.....	.....	
9,600	48,000	.001650	.000050	.....	.....	Elastic limit.
9,800	49,000	.003050	.001400	.....	.....	
10,000	50,000	.003600	.000550	.....	.....	
10,200	51,000	.004650	.001050	.....	.....	
10,400	52,000	.005500	.000850	.....	.....	
10,600	53,000	.006450	.000950	.....	.....	
18,200	91,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,000
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		".85 from neck
Character of broken surface		silky
Elongation of inch sections		".32", ".12

JACKET.

No. 6034.

Marks, $\frac{11265\ B_7\ F_2}{M\ T_2\ M}$
Diameter, ".504.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001400	.000400	0.	.....	
9,200	46,000	.001550	.000150	0.	.....	
9,400	47,000	.001600	.000050	.....	.....	
9,600	48,000	.001650	.000050	.....	.....	
9,800	49,000	.001700	.000050	.....	.....	
10,000	50,000	.001750	.000050	.....	.....	
10,200	51,000	.001850	.000100	.....	.....	
10,400	52,000	.001950	.000100	.....	.....	
10,600	53,000	.002050	.000100	.....	.....	Elastic limit.
10,800	54,000	.002450	.000400	.....	.....	
11,000	55,000	.003200	.000750	.....	.....	
11,200	56,000	.004400	.001200	.....	.....	
11,400	57,000	.005500	.001100	.....	.....	
11,600	58,000	.006750	.001250	.....	.....	
18,880	94,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,400
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.1560
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".8 from neck
Character of broken surface		Granular
Elongation of inch sections		".16*, ".15

JACKET.

No. 6067.

Marks, $\frac{11265\ B_1\ F_2}{B\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001350	.000350	0.	.....	
9,200	46,000	.001550	.000200	0.	.....	
9,400	47,000	.001550	0.	.....	.....	
9,600	48,000	.001600	.000050	.....	.....	
9,800	49,000	.001700	.000100	.....	.....	
10,000	50,000	.001750	.000050	.....	.....	Elastic limit.
10,200	51,000	.002450	.000700	.....	.....	
10,400	52,000	.004500	.002050	.....	.....	
10,600	53,000	.005850	.001350	.....	.....	
10,800	54,000	.006500	.000650	.....	.....	
11,000	55,000	.007250	.007050	.....	.....	
18,880	94,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,400
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1" from neck
Character of broken surface		silky, trace of granulation at the circumference
Elongation of inch sections		".27*, ".18

JACKET.

No. 6077.

Marks, $\frac{11408\ B_2\ F_2}{M\ T_1\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000700	.000300	.....	.....	
6,000	30,000	.001050	.000350	0.	.....	
8,000	40,000	.001450	.000400	.....	.....	
9,200	46,000	.001700	.000250	0.	.....	
10,000	50,000	.001950	.000250	.....	.....	
10,200	51,000	.002000	.000050	.....	.....	
10,400	52,000	.002050	.000050	.....	.....	Elastic limit.
10,600	53,000	.002350	.000300	.....	.....	
10,800	54,000	.002650	.000300	.....	.....	
11,000	55,000	.003000	.000350	.....	.....	
11,200	56,000	.003600	.000600	.....	.....	
11,400	57,000	.004500	.000900	.....	.....	
20,060	100,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100,300
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		".9 from neck
Character of broken surface		granular, silky spot at circumference
Elongation of inch sections		".22* ".12

JACKET.

No. 6079.

Marks, $\frac{1406\ B_1\ F_2}{B\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001050	.000400	.....	.....	
8,000	40,000	.001450	.000400	0.	.....	
9,200	46,000	.001650	.000200	.000050	.000050	
9,400	47,000	.001700	.000050	.....	.....	
9,600	48,000	.001800	.000100	.....	.....	
9,800	49,000	.001950	.000150	.....	.....	
10,000	50,000	.002050	.000100	.....	.....	Elastic limit.
10,200	51,000	.002750	.000700	.....	.....	
10,400	52,000	.004450	.001700	.....	.....	
10,600	53,000	.005000	.000550	.....	.....	
10,800	54,000	.006000	.001000	.....	.....	
11,000	55,000	.006650	.000650	.....	.....	
19,410	97,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,050
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		".95 from neck
Character of broken surface		granular, 80 per cent; silky flaky, 20 per cent
Elongation of inch, sections		".16, ".24*

TABULATION OF TENSION SPECIMENS FROM 3.2-INCH B. L. STEEL FIELD GUNS. (STEMS 2" LONG, ".505 DIAMETER.)

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Pr. ct.*	*Pr. ct.*		
6014	Tube	Middle .	49,000	90,900	22.5	43.3	Silky, oblique.....	Muzzle end.
6095	.....do	....do ...	49,000	95,100	21.5	34.0	Granular, radiating from a silky spot in circumference.	Breech end.
6127	.....do	....do ...	48,000	91,000	22.0	43.3	Silky.....	Muzzle end.
6034	Jacket....	....do ...	53,000	94,400	15.5	16.9	Granular.....	Do.
6067	.....do	....do ...	50,000	94,400	22.5	37.1	Silky, trace of granulation at circumference.	Breech end.
6077	.....do	....do ...	52,000	100,300	17.0	30.7	Granular, silky spot at circumference.	Muzzle end.
6079	.....do	....do ...	50,000	97,050	20.0	27.4	Granular, 80 per cent; silky flaky, 20 per cent.	Breech end.

3.6-INCH B. L. FIELD MORTARS.

SPECIMENS FROM BODIES, BREECH BLOCKS, SPINDLES, AND GAS CHECKS.

STEEL BODIES.

Marks.	Diameter.	Sectional area.	Elastic limit.		Tensile strength.		Elongation in 2 inches.		Area at fracture.		Contraction of area.	Appearance of fracture.
			Total.	Per square inch.	Total.	Per square inch.						
	Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*		*In. Sq. in.*	*Per ct.*	
1	.505	.20	11,000	55,000	18,510	92,550	.38	19.0	Diam..	.42=.1385	30.7	Granular, 60 per cent; silky lamellar, 40 per cent.
2	.505	.20	10,980	54,900	19,410	97,050	.35	17.5	Diam..	.42=.1385	30.7	Granular; silky eccentric spot.
3	.505	.20	10,200	51,000	18,090	90,450	.45	22.5	Diam..	.40=.1257	37.1	Granular, 60 per cent; silky, 40 per cent.
4	.505	.20	9,220	46,100	17,420	97,100	.39	19.5	Diam..	.42=.1385	30.7	Granular; silky serrated at the circumference.
5	.505	.20	11,450	57,250	18,580	92,900	.39	19.5	Diam..	.41=.1320	34.0	Granular; flaky streak.
6	.505	.20	10,020	50,100	17,940	89,700	.41	20.5	Diam..	.41=.1320	34.0	Granular, 60 per cent; dull flaky, 40 per cent.
7	.505	.20	10,510	52,550	17,800	89,000	.46	23.0	Diam..	.39=.1194	40.3	Silky.
8	.505	.20	11,520	57,600	18,870	94,350	.42	21.0	Diam..	.38=.1134	43.3	Do.
9	.505	.20	11,840	59,200	19,810	99,050	.39	19.5	Diam..	.42=.1385	30.7	Granular, 70 per cent; silky flaky, 30 per cent.
10	.505	.20	9,420	47,100	17,340	86,700	.45	22.5	Diam..	.39=.1194	40.3	Granular, 55 per cent; silky flaky, 45 per cent.
11	.505	.20	11,400	57,000	18,960	94,800	.37	18.5	Diam..	.44=.1521	23.9	Granular; flaky spot at the circumference.
12	.505	.20	9,620	48,100	17,880	89,400	.42	21.0	Diam..	.42=.1385	30.7	Granular; flaky streak.
13	.505	.20	11,920	59,600	18,980	94,650	.41	20.5	Diam..	.41=.1320	34.0	Granular, 50 per cent; silky flaky, 50 per cent.
14	.505	.20	12,650	63,250	20,520	102,600	.34	17.0	Diam..	.43=.1452	27.4	Granular; silky serrated at the circumference.
15	.505	.20	9,460	47,300	17,130	85,650	.49	24.5	Diam..	.40=.1257	37.1	Granular, 60 per cent; silky serrated, 40 per cent.
16	.505	.20	12,710	63,550	20,080	100,150	.37	18.5	Diam..	.42=.1385	30.7	Do.
17	.505	.20	10,320	51,600	17,820	89,100	.42	21.0	Diam..	.41=.1320	34.0	Silky flaky, 80 per cent; granular, 20 per cent.
18	.505	.20	12,520	62,600	18,700	98,500	.37	18.5	Diam..	.43=.1452	27.4	Granular; flaky streak.
19	.505	.20	12,650	63,250	20,220	101,100	.34	17.0	Diam..	.42=.1385	30.7	Granular; serrated section across fractured surface.
20	.505	.20	11,480	57,400	19,140	95,700	.37	18.5	Diam..	.43=.1452	27.4	Granular; flaky eccentric spot.
21	.505	.20	10,180	50,900	17,680	88,450	.42	21.0	Diam..	.40=.1257	37.1	Silky; oblique.
22	.505	.20	11,200	56,000	18,080	90,400	.40	20.0	Diam..	.40=.1257	37.1	Dull silky; oblique.
23	.505	.20	11,380	56,900	19,480	97,400	.40	20.0	Diam..	.40=.1257	37.1	Silky, 50 per cent; granular, 50 per cent.
24	.505	.20	12,550	62,750	20,070	100,350	.36	18.0	Diam..	.41=.1320	34.0	Granular; silky center.
25	.505	.20	11,390	56,950	18,220	91,100	.40	20.0	Diam..	.39=.1194	40.3	Silky.
26	.505	.20	11,770	58,850	19,380	96,900	.34	17.0	Diam..	.45=.1590	20.5	Granular; flaky spot at the circumference.
27	.505	.20	11,300	56,500	19,020	95,100	.37	18.5	Diam..	.45=.1590	20.5	Do.
28	.505	.20	10,320	51,600	18,420	92,100	.39	19.5	Diam..	.42=.1385	30.7	Granular, 40 per cent; silky serrated, 60 per cent.
29	.505	.20	11,180	55,900	17,940	89,700	.41	20.5	Diam..	.40=.1257	37.1	Granular, 50 per cent; silky flaky, 50 per cent.
30	.505	.20	10,960	54,800	18,470	92,350	.36	18.0	Diam..	.43=.1452	27.4	Granular; flaky spot at the circumference.
31	.505	.20	9,620	48,100	17,280	86,400	.45	22.5	Diam..	.41=.1320	34.0	Silky serrated, 60 per cent; granular, 40 per cent.
32	.505	.20	10,250	51,250	17,910	89,550	.42	21.0	Diam..	.40=.1257	37.1	Silky serrated; trace of granulation.

Steel Breech Blocks.

Marks.	Diameter.	Sectional area.	Elastic limit. Total.	Elastic limit. Per square inch.	Tensile strength. Total.	Tensile strength. Per square inch.	Elongation in 2 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.
	Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*In. Sq. in.*	*Per ct.*	
2	.505	.20	13,640	68,200	21,030	105,150	.33	16.5	Diam.. .40=.1257	37.1	Silky.
5	.505	.20	10,180	50,900	17,160	85,800	.27	27.0	Diam.. .41=.1320	34.0	Granular, 60 per cent; lamellar, 40 per cent.
10	.505	.20	12,950	64,750	19,420	97,100	.19	19.0	Diam.. .44=.1521	23.9	Granular; radiating from a lamellar spot at circumference.
13	.505	.20	11,960	59,800	17,900	89,500	.36	18.0	Diam.. .41=.1320	34.0	Granular, 60 per cent; silky serrated, 40 per cent.
17	.505	.20	13,280	66,400	19,260	96,300	.38	19.0	Diam.. .41=.1320	34.0	Granular; flaky streak across fracture.
21	.505	.20	12,510	62,550	18,510	92,550	.36	18.0	Diam.. .43=.1452	27.4	Granular; flaky spot at circumference.
25	.505	.20	12,710	63,550	18,780	93,900	.36	18.0	Diam.. .41=.1320	34.0	Granular, 70 per cent; silky serrated, 30 per cent.
29	.505	.20	13,500	67,500	19,760	98,800	.37	18.5	Diam.. .42=.1385	30.7	Granular; silky serrated spot.

Steel Spindles.

2	.505	.20	12,320	61,600	19,580	97,900	.49	24.5	Diam.. .32=.0804	59.8	Fine silky.
5	.505	.20	11,640	58,200	18,490	92,450	.52	26.0	Diam.. .32=.0804	59.8	Do.
10	.505	.20	11,650	58,250	18,540	92,700	.50	25.0	Diam.. .33=.0855	57.2	Do.
13	.505	.20	12,610	63,050	18,660	93,300	.48	24.0	Diam.. .35=.0962	51.9	Fine silky; cup shaped.
17	.505	.20	12,680	63,400	19,060	95,300	.51	25.5	Diam.. .35=.0962	51.9	Do.
21	.505	.20	12,520	62,600	19,440	97,200	.48	24.0	Diam.. .33=.0855	57.2	Do.
25	.505	.20	13,190	65,950	19,310	96,550	.47	23.5	Diam.. .34=.0908	54.6	Do.
29	.505	.20	13,170	65,850	19,690	98,450	.47	23.5	Diam.. .33=.0855	57.2	Do.

Steel Gas Checks.

14 & 28	.505	.20	15,940	79,700	24,680	123,400	.34	17.0	Diam.. .39=.1194	40.3	Fine silky.

5-INCH B. L. SIEGE RIFLES.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6092.

Marks, $\frac{5\,R_{18}\,T.}{M\,T_1\,M.}$
Diameter, .505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000650	.000850	.....	.....	
6,000	30,000	.001000	.000850	.....	.....	
7,000	35,000	.001200	.000200	0.	.....	
8,000	40,000	.001400	.000200	.....	.....	
8,400	42,000	.001500	.000100	.000050	.000050	
8,600	43,000	.001550	.000050	.....	.....	
8,800	44,000	.001600	.000050	.....	.....	
9,000	45,000	.001600	0.	.....	.....	
9,200	46,000	.001650	.000050	.....	.....	
9,400	47,000	.001700	.000050	.....	.....	
9,600	48,000	.001750	.000050	.....	.....	
9,800	49,000	.001800	.000050	.....	.....	
10,000	50,000	.001900	.000100	.....	.....	Elastic limit.
10,200	51,000	.002100	.000200	.....	.....	
10,400	52,000	.002600	.000500	.....	.....	
10,600	53,000	.003950	.001350	.....	.....	
10,800	54,000	.005900	.001950	.....	.....	
11,000	55,000	.006950	.001050	.....	.....	
18,300	91,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,500
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2500
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		″.95 from neck
Character of broken surface		silky
Elongation of inch sections		″.85, ″.15

TUBE.

No. 6093.

Marks, $\frac{5\ R_{12}\ T}{M\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	.....	.....	
8,000	40,000	.001400	.000250	.....	.....	
8,400	42,000	.001500	.000100	.000050	.000050	
8,600	43,000	.001550	.000050	.....	.....	
8,800	44,000	.001600	.000050	.....	.....	
9,000	45,000	.001600	0.	.....	.....	Elastic limit.
9,200	46,000	.001750	.000150	.....	.....	
9,400	47,000	.001850	.000100	.....	.....	
9,600	48,000	.001950	.000100	.....	.....	
9,800	49,000	.002200	.000250	.....	.....	
10,000	50,000	.002450	.000250	.....	.....	
10,200	51,000	.002950	.000500	.....	.....	
10,400	52,000	.003900	.000950	.....	.....	
10,600	53,000	.004950	.001050	.....	.....	
17,460	87,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,300
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".50 from neck
Character of broken surface		silky
Elongation of inch sections		".33*, ".09

TUBE.

No. 6353.

Marks, $\frac{14494\ B_2}{MT_2M}$
Diameter, ".504.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001100	.000100	0.	.....	
8,000	40,000	.001350	.000250	.....	.....	
8,400	42,000	.001450	.000100	.000050	.000050	
9,800	49,000	.001850	.000400	.....	.....	Elastic limit.
10,000	50,000	.002000	.000150	.....	.....	
10,200	51,000	.002750	.000750	.....	.....	
10,400	52,000	.004500	.001750	.....	.....	
10,600	53,000	.006000	.001500	.....	.....	
10,800	54,000	.007000	.001000	.....	.....	
18,430	92,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,150
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2500
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		".75 from neck
Character of broken surface		silky
Elongation of inch sections		".16, ".34*

TUBE.

No. 6393.

Marks, $\frac{5\ R_{18}\ T}{B\ T_1\ M}$
Diameter, ".510.
Sectional area, .204 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
204	1,000	0.	0.	0.	0.	Initial load.
1,020	5,000	.000100	.000100	0.	.....	
2,040	10,000	.000400	.000300	.....	.....	
4,080	20,000	.000700	.000300	.....	.....	
6,120	30,000	.001050	.000350	.....	.....	
7,140	35,000	.001300	.000250	0.	.....	
8,160	40,000	.001400	.000100	.....	.....	
8,568	42,000	.001450	.000050	0.	.....	
9,180	45,000	.001550	.000100	.....	.....	
10,200	50,000	.001700	.000150	.....	.....	
10,404	51,000	.001750	.000050	.....	.....	
10,608	52,000	.001850	.000100	.....	.....	Elastic limit.
10,812	53,000	.002050	.000200	.....	.....	
11,016	54,000	.003000	.000950	.....	.....	
11,220	55,000	.004750	.001750	.....	.....	
11,424	56,000	.006000	.001250	.....	.....	
11,628	57,000	.007300	.001300	.....	.....	
18,480	90,590	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,590
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.130
Reduction in area after rupture, per cent of original section		44.4
Position of rupture		".9 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".32*

TUBE.

No. 6394.

Marks, $\frac{5\ R_2\ T}{B\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001350	.000200	.....	.....	
8,400	42,000	.001450	.000100	0.	.....	
9,600	48,000	.001600	.000150	.....	.....	
9,800	49,000	.001650	.000050	.....	.....	Elastic limit.
10,000	50,000	.002150	.000500	.....	.....	
10,200	51,000	.004000	.001850	.....	.....	
10,400	52,000	.004450	.000450	.....	.....	
10,600	53,000	.005250	.000800	.....	.....	
10,800	54,000	.006550	.001300	.....	.....	
17,960	89,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,800
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		1".1 from neck
Character of broken surface		silky serrated, 60 per cent; granular, 40 per cent
Elongation of inch sections		".25*, ".15

TUBE.

No. 6403.

Marks, $\frac{14484\ B}{M\ T_1\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
7,000	35,000	.001150	.000150	.....	.....	
8,000	40,000	.001350	.000200	.....	.....	
8,400	42,000	.001450	.000100	.000050	.000050	
8,600	43,000	.001500	.000050	.....	.....	
8,800	44,000	.001550	.000050	.....	.....	
9,000	45,000	.001600	.000050	.....	.....	
9,200	46,000	.001650	.000050	.....	.....	
9,400	47,000	.001750	.000100	.....	.....	Elastic limit.
9,600	48,000	.003500	.001750	.....	.....	
9,800	49,000	.004500	.001000	.....	.....	
10,000	50,000	.005150	.000650	.....	.....	
10,200	51,000	.006500	.001350	.....	.....	
10,400	52,000	.007500	.001000	.....	.....	
17,980	89,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,900
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2550
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".75 from neck.
Character of broken surface		silky.
Elongation of inch sections		".37*, ".14

JACKET.

No. 6110.

Marks, $\frac{5\ R_{11}\ J}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000833	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
10,000	40,000	.001367	.000367	0.	.....	
11,500	46,000	.001667	.000300	.000083	.000083	
11,750	47,000	.001733	.000066	.....	.....	
12,000	48,000	.001767	.000084	.....	.....	Elastic limit.
12,250	49,000	.006667	.004900	.....	.....	
12,500	50,000	.007333	.000666	.....	.....	
12,750	51,000	.008167	.000834	.....	.....	
13,000	52,000	.008400	.000233	.....	.....	
13,250	53,000	.009000	.000600	.....	.....	
22,080	88,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,320
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".2 from neck
Character of broken surface		silky
Elongation of inch sections		".14, ".27*, ".27*

JACKET.

No. 6122.

Marks, $\frac{5\ R_1^s\ J}{B\ T_1\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
10,000	40,000	.001367	.000367	0.	.....	
11,250	45,000	.001567	.000200	.....	.....	Elastic limit.
11,500	46,000	.002500	.000933	.....	.....	
		.011667	.009167	.009733	.009733	
11,750	47,000	.012667	.001000	.....	.....	
12,000	48,000	.013333	.000666	.....	.....	
12,250	49,000	.013933	.000600	.....	.....	
12,500	50,000	.014833	.000900	.....	.....	
20,620	82,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,480
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001567
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		″1.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.35*, ″.21, ″.16

JACKET.

No. 6178.

Marks, $\frac{11714\ B}{M\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001033	.000366	.....	.....	
10,000	40,000	.001433	.000400	.000067	.000067	
11,500	46,000	.001700	.000267	.000133	.000066	Elastic limit.
11,750	47,000	.002500	.000800	.....	.....	
12,000	48,000	.003667	.001167	.....	.....	
12,250	49,000	.004900	.001233	.....	.....	
12,500	50,000	.005933	.001033	.....	.....	
12,750	51,000	.006433	.000500	.....	.....	
13,000	52,000	.007333	.000900	.....	.....	
23,270	93,080	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	93,080
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section	.....	86.4
Position of rupture	.....	".35 from neck
Character of broken surface	.....	granular 50 per cent, silky 50 per cent
Elongation of inch sections	.....	".29, ".11, ".09

JACKET.

No. 6336.

Marks, $\frac{14461\ B_2}{B\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length. 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
10,000	40,000	.001333	.000333	.000083	.000083	
11,250	45,000	.001500	.000167	.....	.....	Elastic limit.
11,500	46,000	.005667	.004167	.008967	.008984	
11,750	47,000	.008667	.003000	.....	.....	
12,000	48,000	.009667	.001000	.....	.....	
12,250	49,000	.010400	.000733	.....	.....	
12,500	50,000	.011567	.001167	.....	.....	
20,090	80,360	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,360
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2367
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.36*, ″.19, ″.16

JACKET.

No. 6350.

Marks, $\overset{5\ R_{1s}\ J}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
10,000	40,000	.001300	.000333	.....	.....	
11,500	46,000	.001533	.000233	.....	.....	
12,500	50,000	.001667	.000134	.....	.....	
13,750	55,000	.001833	.000166	.....	.....	
14,000	56,000	.001900	.000067	.....	.....	
14,250	57,000	.001967	.000067	.....	.....	Elastic limit.
14,500	58,000	.002667	.000700	.....	.....	
14,750	59,000	.004333	.001666	.....	.....	
15,000	60,000	.006333	.002000	.....	.....	
15,250	61,000	.007333	.001000	.....	.....	
15,500	62,000	.008433	.001100	.....	.....	
23,590	94,360	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,360
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.001967
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per cent of original section		36.4
Position of rupture		".8 from neck
Character of broken surface		granular, 60 per cent; silky, 40 per cent
Elongation of inch sections		.".09, .".12, .".28*

JACKET.

No. 6351.

Marks, $\frac{5\ R_1\ J}{M\ T_1\ O}$
Diameter ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
10,000	40,000	.001333	.000333	0.	.....	
11,500	46,000	.001533	.000200	.....	.....	
12,500	50,000	.001700	.000167	.....	.....	
14,500	58,000	.002000	.000300	.....	.....	
14,750	59,000	.002083	.000083	.....	.....	Elastic limit.
15,000	60,000	.002200	.000167	.....	.....	
15,250	61,000	.002333	.000133	.....	.....	
15,500	62,000	.002767	.000434	.....	.....	
15,750	63,000	.004333	.001566	.....	.....	
16,000	64,000	.006667	.002334	.....	.....	
24,540	98,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98,160
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.002083
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1″.4 from neck
Character of broken surface		silky
Elongation of inch sections		″.12, ″.32*, ″.14

JACKET.

No. 6376.

Marks, $\frac{14447\ B_4}{M\ T_2}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000667	.000867	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
10,000	40,000	.001333	.000333	0.	.....	
11,500	46,000	.001567	.000234	0.	.....	
11,750	47,000	.001600	.000033	.....	.....	
12,000	48,000	.001633	.000033	.....	.....	
12,250	49,000	.001700	.000067	.....	.....	
12,500	50,000	.001733	.000033	.....	.....	Elastic limit.
12,750	51,000	.003167	.001434	.....	.....	
13,000	52,000	.006667	.003500	.....	.....	
13,250	53,000	.007000	.000333	.....	.....	
13,500	54,000	.007667	.000667	.....	.....	
13,750	55,000	.008500	.000833	.....	.....	
23,740	94,960	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,960
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per cent of original section		86.4
Position of rupture		1″.2 from neck
Character of broken surface		silky, flaky, 30 per cent; granular, 70 per cent
Elongation of inch sections		″.25, ″.22*, ″.16

TABULATION OF TENSION SPECIMENS FROM 5-INCH B. L. SIEGE RIFLES (STEMS OF SPECIMENS FROM TUBES 2″ LONG, ″.505 DIAMETER).

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*P. ct.*	*P. ct.*		
6092	Tube	Middle .	50,000	91,500	25.0	46.2	Silky	Muzzle end.
6093	.....do	....do ...	45,000	87,300	21.0	46.2	.....do	Do.
6353	.....do	....do ...	49,000	92,150	25.0	40.3	.....do	Do.
6393	.....do	....do ...	52,000	90,590	21.5	44.4	.....do	Breech end.
6394	.....do	....do ...	49,000	89,800	20.0	34.0	Silky, serrated, 60 per cent; granular, 40 per cent.	Do.
6403	.....do	....do ...	47,000	89,900	25.5	46.2	Silky	Muzzle end.
STEMS OF SPECIMENS FROM JACKETS 3″ LONG, ″.564 DIAMETER.								
6110	Jacket	Outside.	48,000	88,320	22.7	44.6	Silky	Muzzle end.
6122	.....do	Middle .	45,000	82,480	24.0	49.7	.....do	Breech end.
6178	.....do	....do ...	46,000	93,080	16.3	36.4	Granular, 50 per cent; silky, 50 per cent.	Muzzle end.
6336	.....do	....do ...	45,000	80,360	23.7	49.7	Silky	Breech end.
6350	.....do	Outside.	57,000	94,360	16.3	36.4	Granular, 60 per cent; silky, 40 per cent.	Muzzle end.
6351	.....do	....do ...	59,000	98,160	19.3	44.6	Silky	Do.
6376	.....do	Middle .	50,000	94,960	21.0	36.4	Silky, flaky, 30 per cent; granular, 70 per cent.	Do.

5-INCH R. F. GUNS.

SPECIMENS FROM JACKETS.

JACKET.

No. 5988.

Marks, $\frac{10156\ B_4}{B\ T_1\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
5,000	20,000	.000567	.000300	.....	.....	
7,500	30,000	.000967	.000400	.....	.....	
10,000	40,000	.001300	.000333	0.	.....	
11,500	46,000	.001533	.000233	0.	.....	
11,750	47,000	.001567	.000034	.....	.....	
12,000	48,000	.001600	.000033	.....	.....	
12,250	49,000	.001633	.000033	.....	.....	
12,500	50,000	.001667	.000034	.....	.....	Elastic limit.
12,750	51,000	.001833	.000166	.....	.....	
13,000	52,000	.002400	.000567	.....	.....	
13,250	53,000	.003167	.000767	.....	.....	
13,500	54,000	.003667	.000500	.....	.....	
13,750	55,000	.004200	.000533	.....	.....	
23,820	95,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,280
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".21 from neck
Character of broken surface		silky
Elongation of inch sections		".20*, ".21*

JACKET.

No. 6015.

Marks, $\frac{11268\ B_4}{M\ T_1\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	.....	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000667	.000367	.....	.....	
7,500	30,000	.001033	.000366	.....	.....	
10,000	40,000	.001400	.000367	.....	.....	
11,500	46,000	.001633	.000233	.000033	.000033	
11,750	47,000	.001667	.000034	.....	.....	
12,000	48,000	.001700	.000033	.....	.....	Elastic limit.
12,250	49,000	.002667	.000967	.....	.....	
12,500	50,000	.006167	.003500	.....	.....	
12,750	51,000	.007333	.001166	.....	.....	
13,000	52,000	.008000	.000667	.....	.....	
13,250	53,000	.008867	.000867	.....	.....	
22,190	88,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,760
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2433
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1″.2 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		″.14, ″.35*, ″.24

JACKET.

No. 6064.

Marks, $\frac{11466\ B_2}{M\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000700	.000367	.....	.....	
7,500	30,000	.001067	.000367	.....	.....	
10,000	40,000	.001467	.000400	0.	.....	
11,500	46,000	.001667	.000200	0.	.....	
11,750	47,000	.001700	.000033	.....	.....	
12,000	48,000	.001767	.000067	.....	.....	
12,250	49,000	.001833	.000066	.....	.....	Elastic limit.
12,500	50,000	.001967	.000134	.....	.....	
12,750	51,000	.002300	.000333	.....	.....	
13,000	52,000	.008333	.001033	.....	.....	
13,250	53,000	.004767	.001434	.....	.....	
13,500	54,000	.006167	.001400	.....	.....	
23,420	93,680	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	93,680
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001833
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".15 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".11, ".24, ".28*

JACKET.

No. 6153.

Marks, $\frac{11466\ B}{M\ T,\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	"
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
10,000	40,000	.001367	.000367	0.	.....	
11,500	46,000	.001600	.000233	.000033	.000033	
11,750	47,000	.001633	.000033	.....	.....	
12,000	48,000	.001667	.000034	.....	.....	
12,250	49,000	.001700	.000033	.....	.....	Elastic limit.
12,500	50,000	.002200	.000500	.....	.....	
12,750	51,000	.003333	.001133	.....	.....	
13,000	52,000	.006333	.003000	.....	.....	
13,250	53,000	.007167	.000834	.....	.....	
13,500	54,000	.007667	.000500	.....	.....	
23,710	94,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,840
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per cent of original section	.....	41.9
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".30*, ".19, ".11

JACKET.

No. 6253.

Marks, $\frac{11497\ B_2}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000567	.000800	.....	.....	
7,500	30,000	.000933	.000366	.....	.....	
10,000	40,000	.001300	.000367	0.	.....	
11,500	46,000	.001400	.000100	0.	.....	
11,750	47,000	.001467	.000067	.....	.....	
12,000	48,000	.001500	.000033	.....	.....	
12,250	49,000	.001567	.000067	.....	.....	
12,500	50,000	.001600	.000033	.....	.....	
12,750	51,000	.001633	.000033	.....	.....	Elastic limit.
13,000	52,000	.002033	.000400	.....	.....	
13,250	53,000	.005433	.003400	.....	.....	
13,500	54,000	.006400	.000967	.....	.....	
13,750	55,000	.007033	.000633	.....	.....	
14,000	56,000	.008333	.001300	.....	.....	
22,890	91,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,560
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch...	.2267
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		".35 from neck
Character of broken surface		silky
Elongation of inch sections		".20, ".35, ".13

TABULATION OF TENSION SPECIMENS FROM 5-INCH R. F. GUNS (STEMS 3" LONG, ".564 DIAMETER).

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Per ct.*	*Per ct.*		
6060	Jacket....	Middle .	50,000	95,280	16.3	44.6	silky	Breech end.
6015	....do	....do ...	48,000	88,760	24.3		ique.....	Muzzle end.
6064	....do	....do ...	49,000	93,680	21.0	...	.....	Do.
6153	....do	....do ...	49,000	94,840	20.0	41.9	Silky	Do.
6253	....do	....do ...	51,000	91,560	22.7	41.9	.....do.....	Breech end.

6-INCH R. F. GUNS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6088.

Marks, $6\ \frac{R\ F_{11}\ T}{M\ T_{1}\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001100	.000150	0.	.....	
8,000	40,000	.001250	.000150	.....	.....	
8,400	42,000	.001350	.000100	0.	.....	
9,000	45,000	.001450	.000100	.....	.....	
10,000	50,000	.001600	.000150	.....	.....	
10,800	54,000	.001700	.000100	.....	.....	Elastic limit.
11,000	55,000	.005500	.003800	.....	.....	
11,200	56,000	.008750	.003250	.....	.....	
11,400	57,000	.009800	.000550	.....	.....	
11,600	58,000	.010000	.000700	.....	.....	
11,800	59,000	.011000	.001000	.....	.....	
17,970	89,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,850
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".6 from neck
Character of broken surface		silky
Elongation of inch sections		".09, ".34*

TUBE.

No. 6091.

Marks, $\frac{6\,R\,F_{13}T}{B\,T_2\,M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001300	.000150	.....	.....	
8,400	42,000	.001350	.000050	0.	.....	
8,600	43,000	.001400	.000050	.....	.....	
8,800	44,000	.001450	.000050	.....	.....	
9,000	45,000	.001500	.000050	.....	.....	
9,200	46,000	.001550	.000050	.....	.....	
9,400	47,000	.001600	.000050	.....	.....	
9,600	48,000	.001650	.000050	.....	.....	Elastic limit.
9,800	49,000	.001800	.000150	.....	.....	
10,000	50,000	.001950	.000150	.....	.....	
10,200	51,000	.002100	.000150	.....	.....	
10,400	52,000	.002400	.000300	.....	.....	
10,600	53,000	.003000	.000600	.....	.....	
10,800	54,000	.004000	.001000	.....	.....	
11,000	55,000	.005250	.001250	.....	.....	
18,410	92,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,050
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.1950
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section	do...	37.1
Position of rupture		".6 from neck
Character of broken surface		granulated, 40 per cent; silky center, 60 per cent
Elongation of inch sections		".10, ".29*

TUBE.

No. 6094.

Marks, $\frac{6\,R\,F_{12}\,T}{M\,T_2\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	
1,000	5,000	.000100	.000100	0.	.....	Initial load.
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000850	.000450	.....	.....	
6,000	30,000	.001100	.000250	.....	.....	
7,000	35,000	.001350	.000250	.000050	.000050	
8,000	40,000	.001450	.000100	.....	.....	
8,400	42,000	.001550	.000100	.000100	.000050	
8,600	43,000	.001600	.000050	.....	.....	
8,800	44,000	.001700	.000100	.....	.....	
9,000	45,000	.001800	.000100	.....	.....	
9,200	46,000	.001850	.000050	.....	.....	
9,400	47,000	.001900	.000050	.....	.....	
9,600	48,000	.001950	.000050	.....	.....	Elastic limit.
9,800	49,000	.002100	.000150	.....	.....	
10,000	50,000	.002400	.000300	.....	.....	
10,200	51,000	.002750	.000350	.....	.....	
10,400	52,000	.008400	.000650	.....	.....	
10,600	53,000	.005350	.001950	.....	.....	
17,710	88,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,550
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.001950
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		″.45 from neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.34*

TUBE.

No. 6231.

Marks, $^{6\ R\ F_V\ T}_{M\ T_1\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001150	.000200	0.	.....	
8,000	40,000	.001250	.000100	.....	.....	
8,400	42,000	.001350	.000100	0.	.....	
10,000	50,000	.001650	.000300	.....	.....	
11,000	55,000	.001800	.000150	.....	.....	
11,200	56,000	.001850	.000050	.....	.....	
11,400	57,000	.001950	.000100	.....	.....	
11,600	58,000	.002000	.000050	.....	.....	
11,800	59,000	.002050	.000050	.....	.....	Elastic limit.
12,000	60,000	.002450	.000400	.....	.....	
12,200	61,000	.003600	.001150	.....	.....	
12,400	62,000	.005600	.002000	.....	.....	
12,600	63,000	.007000	.001400	.....	.....	
12,800	64,000	.008050	.001050	.....	.....	
19,080	95,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,400
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.2350
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		".9 from neck
Character of broken surface		silky
Elongation of inch sections		".15, ".32*

TUBE.

No. 6232.

Marks, $^{6\,R\,F_{18}\,T}_{M\,T_2\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	
1,000	5,000	.000100	.000100	.....	.....	Initial load.
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000550	.000300	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
7,000	35,000	.001100	.000150	.....	.....	
8,000	40,000	.001350	.000250	.....	.....	
8,400	42,000	.001400	.000050	.....	.....	
9,600	45,000	.001550	.000150	.....	.....	
9,800	49,000	.001600	.000050	.....	.....	
10,000	50,000	.001650	.000050	.....	.....	Elastic limit.
10,200	51,000	.004900	.003250	.....	.....	
10,400	52,000	.010250	.005350	.....	.....	
10,800	53,000	.011000	.000750	.....	.....	
10,800	54,000	.012000	.001000	.....	.....	
11,000	55,000	.013050	.001050	.....	.....	Tensile strength.
16,810	84,050	.....	.....	.....	.....	

General summary.

Tensile strength per square inch of original section	pounds..	84,050
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		″.4 from neck
Character of broken surface		silky
Elongation of inch sections		″.31*, ″.10

TUBE.

No. 6234.

Marks, $\frac{6\ R\ F_{19}\ T}{M\ T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001200	.000200	.....	.....	
8,000	40,000	.001350	.000150	.....	.....	
8,400	42,000	.001450	.000100	.....	.....	
10,000	50,000	.001700	.000250	.....	.....	
10,200	51,000	.001750	.000050	.....	.....	
10,400	52,000	.001800	.000050	.....	.....	
10,600	53,000	.001850	.000050	.....	.....	
10,800	54,000	.001900	.000050	.....	.....	Elastic limit.
11,000	55,000	.004250	.002350	.....	.....	
11,200	56,000	.006000	.001750	.....	.....	
11,400	57,000	.007050	.001050	.....	.....	
11,600	58,000	.008450	.001400	.....	.....	
11,800	59,000	.009500	.001050	.....	.....	
17,890	89,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,450
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		″.9 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.33*

JACKET.

No. 6065.

Marks, $\frac{6\ R\ F_9\ J}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000333	.000200			
5,000	20,000	.000667	.000334			
7,500	30,000	.001033	.000366			
10,000	40,000	.001400	.000367	0.		
11,500	46,000	.001600	.000200	0.		
11,750	47,000	.001633	.000033			
12,000	48,000	.001700	.000067			
12,250	49,000	.001767	.000067			
12,500	50,000	.001800	.000033			
12,750	51,000	.001833	.000033			
13,000	52,000	.001867	.000034			
13,250	53,000	.001933	.000066			
13,500	54,000	.002000	.000067			
13,750	55,000	.002067	.000067			Elastic limit.
14,000	56,000	.003167	.001100			
14,250	57,000	.004333	.001166			
14,500	58,000	.006167	.001834			
14,750	59,000	.006933	.000766			
15,000	60,000	.007967	.001034			
23,730	94,920					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,920
Elastic limit, per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2167
Elongation per inch under strain at elastic limit	do...	.002067
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".7 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".40*, ".14

JACKET.

No. 6066.

Marks, $\frac{6\,R\,F_{10}\,J}{M\,T_1\,O}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000367	.000234	.....	.....	
5,000	20,000	.000700	.000333	.....	.....	
7,500	30,000	.001067	.000367	.....	.....	
10,000	40,000	.001433	.000366	0.	.....	
11,500	46,000	.001633	.000200	0.	.....	
11,750	47,000	.001667	.000034	.....	.....	
12,000	48,000	.001700	.000033	.....	.....	
12,250	49,000	.001733	.000033	.....	.....	
12,500	50,000	.001767	.000034	.....	.....	
12,750	51,000	.001833	.000066	.....	.....	
13,000	52,000	.001900	.000067	.....	.....	
13,250	53,000	.001933	.000033	.....	.....	Elastic limit.
13,500	54,000	.002933	.001000	.....	.....	
13,750	55,000	.003500	.000567	.....	.....	
14,000	56,000	.005000	.001500	.....	.....	
14,250	57,000	.006900	.001900	.....	.....	
14,500	58,000	.009100	.002200	.....	.....	
22,470	89,880	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,880
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.001933
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		″.95 from neck
Character of broken surface		silky
Elongation of inch sections		″.37*, ″.16, ″.11

JACKET.

No. 6087.

Marks, $\frac{6\ R\ F_{19}\ J}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.
Stem did not run true with threaded ends.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	0.	.....	
2,500	10,000	.000433	.000233	.....	.....	
5,000	20,000	.000800	.000367	.....	.....	
7,500	30,000	.001233	.000433	.....	.....	
8,750	35,000	.001333	.000100	.....	.....	
9,000	36,000	.001400	.000067	.....	.....	Elastic limit.
9,250	37,000	.001533	.000133	.....	.....	
9,500	38,000	.001667	.000134	.....	.....	
9,750	39,000	.001833	.000166	.....	.....	
10,000	40,000	.002000	.000167	.000567	.000567	
11,000	44,000	.003000	.001000	.....	.....	
11,250	45,000	.004333	.001333	.....	.....	
11,500	46,000	.008333	.004000	.....	.....	
21,340	85,360	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,360
Elastic limit per square inch of original section	do...	36,000
Elongation per inch after rupture	inch..	.2233
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1″.15 from neck
Character of broken surface		silky
Elongation of inch sections		″.33*, ″.22, ″.12

JACKET.

No. 6233.

Marks, $\frac{6\ R\ F_U\ J}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	.....	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.001000	.000367	.....	.....	
10,000	40,000	.001367	.000367	0.	.....	
11,500	46,000	.001567	.000200	0.	.....	
12,500	50,000	.001700	.000133	.....	.....	
12,750	51,000	.001733	.000033	.....	.....	
13,000	52,000	.001767	.000034	.....	.....	
13,250	53,000	.001833	.000066	.....	.....	
13,500	54,000	.001900	.000067	.....	.....	
13,750	55,000	.001967	.000067	.....	.....	
14,000	56,000	.002000	.000033	.....	.....	
14,250	57,000	.002067	.000067	.....	.....	Elastic limit.
14,500	58,000	.002300	.000233	.....	.....	
14,750	59,000	.002533	.000233	.....	.....	
15,000	60,000	.003033	.000500	.....	.....	
15,250	61,000	.003567	.000534	.....	.....	
15,500	62,000	.004767	.001200	.....	.....	
24,480	97,920	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,920
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.1433
Elongation per inch under strain at elastic limit	do...	.002067
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		".5 from neck
Character of broken surface		granular at circumference, silky center
Elongation of inch sections		".06, ".09, ".28*

JACKET.

No. 6235.

Marks, $\frac{6\ R\ F_{13}\ J}{M\ T_1\ 8}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.000967	.000300	.....	.....	
10,000	40,000	.001333	.000366	0.	.....	
10,500	42,000	.001367	.000034	0.	.....	
12,500	50,000	.001667	.000300	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	
13,250	53,000	.001833	.000100	.....	.....	
13,500	54,000	.001867	.000034	.....	.....	
13,750	55,000	.001900	.000033	.....	.....	Elastic limit.
14,000	56,000	.002100	.000200	.....	.....	
14,250	57,000	.002567	.000567	.....	.....	
14,500	58,000	.004167	.001500	.....	.....	
14,750	59,000	.005167	.001000	.....	.....	
15,000	60,000	.006600	.001433	.....	.....	
23,140	92,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,560
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2167
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1".25 from neck
Character of broken surface		silky
Elongation of inch sections		".25*, ".27*, ".13

JACKET.

No. 6236.

Marks, $\frac{6\ R\ F_{6}\ J}{M\ T_{1}\ 8}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000967	.000367	.....	.....	
10,000	40,000	.001300	.000333	0.	.....	
11,500	46,000	.001467	.000167	0.	.....	
12,500	50,000	.001667	.000200	.....	.....	
12,750	51,000	.001667	0.	.....	.....	
13,000	52,000	.001733	.000066	.....	.....	Elastic limit.
13,250	53,000	.001900	.000167	.....	.....	
13,500	54,000	.003667	.001767	.....	.....	
13,750	55,000	.004667	.001000	.....	.....	
14,000	56,000	.005800	.001133	.....	.....	
14,250	57,000	.006733	.000933	.....	.....	
23,080	92,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,320
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1".5 from neck
Character of broken surface		silky
Elongation of inch sections		".18, ".34*, ".11

TABULATION OF TENSION SPECIMENS FROM 6-INCH R. F. GUNS (STEMS OF SPECIMENS FROM TUBES 2" LONG, ".505 DIAMETER).

Test number.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Per ct.*	*Per ct.*		
6088	Tube	Middle .	54,000	89,850	21.5	46.2	Silky.....	Muzzle end.
6091	.....do.....	...do....	48,000	92,050	19.5	37.1	Granular 40 per cent, silky center 60 per cent.	Breech end.
6094	.....do.....	...do....	48,000	88,550	22.5	46.2	Silky.....	Muzzle end.
6231	.....do.....	...do....	59,000	95,400	23.5	49.1	.....do.....	Do.
6232	.....do.....	...do....	50,000	84,050	20.5	51.9	.....do.....	Do.
6234	.....do.....	...do....	54,000	89,450	24.0	49.1	.....do.....	Do.

STEMS OF SPECIMENS FROM JACKETS 3" LONG, ".564 DIAMETER.

6065	Jacket....	Outside.	55,000	94,920	21.7	44.6	Silky.....	Muzzle end.
6066	.....do.....	...do....	53,000	89,880	21.3	47.2	.....do.....	Do.
6087	.....do.....	...do	36,000	85,360	22.3	49.7	.....do.....	Do.
6233	.....do.....	...do....	57,000	97,920	14.3	39.2	Granular at the circumference, silky center.	Do.
	.....do.....	...do....	55,000	92,560	21.7	47.2	Silky.....	Do.
	.....do.....	...do....	52,000	92,320	21.0	49.7	.....do.....	Do.

7-INCH B. L. SIEGE HOWITZERS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6148.

Marks, B9-7T.
Diameter, " 505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000700	.000350	.....	.....	
6,000	30,000	.001000	.000300	.....	.....	
7,000	35,000	.001200	.000200	0.	.....	
8,000	40,000	.001450	.000250	.....	.....	
8,400	42,000	.001500	.000050	.000050	.000050	
8,600	43,000	.001550	.000050	.....	.....	
8,800	44,000	.001650	.000100	.....	.....	Elastic limit.
9,000	45,000	.004250	.002600	.....	.....	
9,200	46,000	.006250	.002000	.....	.....	
9,400	47,000	.007500	.001250	.....	.....	
9,600	48,000	.008150	.000650	.....	.....	
9,800	49,000	.009900	.001750	.....	.....	
16,180	80,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,900
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2550
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".05 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".33*, ".18

TUBE.

No. 6206.

Marks, $\frac{B76}{B_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001200	.000200	0.	.....	
8,000	40,000	.001400	.000200	.....	.....	
8,400	42,000	.001500	.000100	0.	.....	
9,400	47,000	.001650	.000150	.....	.....	
9,600	48,000	.001700	.000050	.....	.....	
9,800	49,000	.001750	.000050	.....	.....	
10,000	50,000	.001800	.000050	.....	.....	
10,200	51,000	.001900	.000100	.....	.....	
10,400	52,000	.001950	.000050	.....	.....	
10,600	53,000	.002000	.000050	.....	.....	Elastic limit.
10,800	54,000	.002300	.000300	.....	.....	
11,000	55,000	.002750	.000450	.....	.....	
11,200	56,000	.003500	.000750	.....	.....	
11,400	57,000	.004100	.000600	.....	.....	
11,600	58,000	.005250	.001150	.....	.....	
20,210	101,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,050
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1".05 from neck
Character of broken surface		silky, trace of granulation
Elongation of inch sections		".25*, ".15

TUBE.

No. 6207.

Marks, $\frac{B\,77.}{B\,2.}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001300	.000150	.....	.....	
8,400	42,000	.001400	.000100	0.	.....	
9,600	48,000	.001550	.000150	.....	.....	
9,800	49,000	.001600	.000050	.....	.....	
10,000	50,000	.001600	0.	.....	.....	Elastic limit.
10,200	51,000	.001750	.000150	.....	.....	
10,400	52,000	.001950	.000200	.....	.....	
10,600	53,000	.003100	.001150	.....	.....	
10,800	54,000	.003950	.000850	.....	.....	
11,000	55,000	.005150	.001200	.....	.....	
19,280	96,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,400
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section	.....	40.3
Position of rupture	.....	1".07 from neck
Character of broken surface	.....	silky
Elongation of inch sections	.....	".17, ".26".

JACKET.

No. 6208.

Marks, $\frac{B\ 101\text{-}1.}{B\ 3.}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load,
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
10,000	40,000	.001333	.000333	0.	.....	
11,500	46,000	.001500	.000167	.....	.....	
12,500	50,000	.001667	.000167	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	
13,250	53,000	.001767	.000034	.....	.....	
13,500	54,000	.001800	.000033	.....	.....	
13,750	55,000	.001867	.000067	.....	.....	Elastic limit.
14,000	56,000	.002000	.000133	.....	.....	
14,250	57,000	.002200	.000200	.....	.....	
14,500	58,000	.002900	.000700	.....	.....	
14,750	59,000	.003567	.000667	.....	.....	
15,000	60,000	.005000	.001433	.....	.....	
25,030	100,120	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100,120
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.001867
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		1".4 from neck
Character of broken surface		silky
Elongation of inch sections		".17, ".28*, ".19

JACKET.

No. 6277.

Marks, $\frac{B-86-75}{M_1}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000800	.000167	.....	.....	
5,000	20,000	.000833	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
10,000	40,000	.001300	.000333	0.	.....	
11,500	46,000	.001533	.000333	0.	.....	
12,500	50,000	.001667	.000134	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	
13,250	53,000	.001767	.000034	.....	.....	
13,500	54,000	.001833	.000066	.....	.....	Elastic limit.
13,750	55,000	.001933	.000100	.....	.....	
		.004000	.002067	.....	.....	
14,000	56,000	.005667	.001667	.....	.....	
14,250	57,000	.006900	.001233	.....	.....	
14,500	58,000	.008000	.001100	.....	.....	
14,750	59,000	.008667	.000667	.....	.....	
23,820	95,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,280
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.001833
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		at middle of stem
Character of broken surface		silky, traces of granulation
Elongation of inch sections		".10, ".32, ".11

TABULATION OF TENSION SPECIMENS FROM 7-INCH B. L. SIEGE HOWITZERS.

STEMS OF SPECIMENS FROM TUBES 2" LONG, ".505 DIAMETER.

No. of test.	Position in gun.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
		Pounds.	*Pounds.*	*Per. ct.*	*Per. ct.*		
6148	Tube	44,000	80,900	25.5	43.3	Silky, oblique.....	Breech end.
6206	.....do	53,000	101,050	20.0	37.1	Silky, trace of granulation...	Do.
6207	.....do	50,000	96,400	21.5	40.3	Silky	Do.

STEMS OF SPECIMENS FROM JACKETS 3" LONG, ".564 DIAMETER.

6208	Jacket....	55,000	100,120	21.3	39.2	Silky	Breech end.
6277	.....do	54,000	95,280	17.7	41.9	Silky, trace of granulation...	Do.

10-INCH STEEL B. L. RIFLES.

SPECIMEN FROM JACKET.

JACKET.

No. 6236.

Marks, $\frac{6\ R\ F_{3}\ J}{M\ T_{1}\ 6}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000967	.000367	.....	.....	
10,000	40,000	.001300	.000333	0.	.....	
11,500	46,000	.001467	.000167	0.	.....	
12,500	50,000	.001667	.000200	.....	.....	
12,750	51,000	.001667	0.	.....	.....	
13,000	52,000	.001733	.000066	.....	.....	Elastic limit.
13,250	53,000	.001900	.000167	.....	.....	
13,500	54,000	.003667	.001767	.....	.....	
13,750	55,000	.004667	.001000	.....	.....	
14,000	56,000	.005800	.001133	.....	.....	
14,250	57,000	.006733	.000933	.....	.....	
23,080	92,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,320
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1".5 from neck
Character of broken surface		silky
Elongation of inch sections		".18,".34*,".11

TABULATION OF TENSION SPECIMENS FROM 6-INCH R. F. GUNS (STEMS OF SPECIMENS FROM TUBES 2" LONG, ".505 DIAMETER).

Test number.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Per ct.*	*Per ct.*		
6088	Tube	Middle .	54,000	89,850	21.5	46.2	Silky.....	Muzzle end.
6091	.....do	...do	48,000	92,050	19.5	37.1	Granular 40 per cent, silky center 60 per cent.	Breech end.
6094	.....do	...do	48,000	88,550	22.5	46.2	Silky.....	Muzzle end.
6231	.....do	...do	59,000	95,400	23.5	49.1	.....do.....	Do.
6232	.....do	...do	50,000	84,050	20.5	51.9	.....do.....	Do.
6234	.....do	...do	54,000	89,450	24.0	49.1	.....do.....	Do.

STEMS OF SPECIMENS FROM JACKETS 3" LONG, ".564 DIAMETER.

6065	Jacket....	Outside.	55,000	94,920	21.7	44.6	Silky.....	Muzzle end.
6066	.....do	...do	53,000	89,880	21.3	47.2	.....do.....	Do.
6087	.....do	...do ...	36,000	85,360	22.8	49.7	.....do.....	Do.
6233	.....do	...do	57,000	97,920	14.3	39.2	Granular at the circumference, silky center.	Do.
6235	.....do	...do	55,000	92,560	21.7	47.2	Silky.....	Do.
6236	.....do	...do	52,000	92,320	21.0	49.7	.....do.....	Do.

7-INCH B. L. SIEGE HOWITZERS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6148.

Marks, B9-7T.
Diameter, " 505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000700	.000850	.....	.....	
6,000	30,000	.001000	.000300	.....	.....	
7,000	35,000	.001200	.000200	0.	.....	
8,000	40,000	.001450	.000250	.....	.....	
8,400	42,000	.001500	.000050	.000050	.000050	
8,600	43,000	.001550	.000050	.....	.....	
8,800	44,000	.001650	.000100	.....	.....	Elastic limit.
9,000	45,000	.004250	.002600	.....	.....	
9,200	46,000	.006250	.002600	.....	.....	
9,400	47,000	.007500	.001250	.....	.....	
9,600	48,000	.008150	.000650	.....	.....	
9,800	49,000	.009900	.001750	.....	.....	
16,180	80,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,900
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2550
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".05 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".33*, ".18

TUBE.

No. 6205.

Marks, $\frac{12452\ B_1}{M\ T_5\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001033	.000366	.....	.....	
8,750	35,000	.001233	.000200	.000033	.000033	
10,000	40,000	.001400	.000167	.000033	0.	
10,250	41,000	.001433	.000033	.....	.....	
10,500	42,000	.001467	.000034	.....	.....	
10,750	43,000	.001533	.000066	.....	.....	
11,000	44,000	.001600	.000067	.....	.....	
11,250	45,000	.001633	.000033	.....	.....	Elastic limit.
11,500	46,000	.004667	.003034	.....	.....	
11,750	47,000	.007067	.002400	.....	.....	
12,000	48,000	.007833	.000766	.....	.....	
12,250	49,000	.008500	.000667	.....	.....	
12,500	50,000	.009333	.000833	.....	.....	
22,320	89,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	89,280
Elastic limit, per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.1967
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		".95 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		"34*, ".15, ".10

TUBE.

No. 6211.

Marks, $\frac{12\ R_{28}\ T}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001200	.000200	0.	.....	
10,000	40,000	.001367	.000167	.000033	.000033	
10,250	41,000	.001400	.000033	.....	.....	
10,500	42,000	.001433	.000033	.....	.....	
10,750	43,000	.001500	.000067	.....	.....	
11,000	44,000	.001567	.000067	.....	.....	
11,250	45,000	.001633	.000066	.....	.....	Elastic limit.
11,500	46,000	.013633	.012000	.....	.....	
11,750	47,000	.014700	.001067	.....	.....	
12,000	48,000	.015700	.001000	.....	.....	
12,250	49,000	.016633	.000933	.....	.....	
12,500	50,000	.017767	.001134	.....	.....	
20,190	80,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,760
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2567
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.22, ″.39, ″.16

TUBE.

No. 6258.

Marks, $\frac{12\,R\,\text{a}\,T}{BT_1\,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3"..

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.001000	.000400	.....	.....	
8,750	35,000	.001267	.000267	.000200	.000200	Elastic limit.
9,000	36,000	.001533	.000266	.....	.....	
9,250	37,000	.001833	.000300	.....	.....	
9,500	38,000	.002300	.000467	.....	.....	
9,750	39,000	.003100	.000800	.....	.....	
10,000	40,000	.006867	.003767	.005533	.005333	
10,250	41,000	.008600	.001733	.....	.....	
10,500	42,000	009500	.000900	.....	.....	
20,020	80,080	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,080
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001267
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section	.....	49.7
Position of rupture	.....	".7 from neck
Character of broken surface	.....	silky
Elongation of inch sections	.....	".14,".17,".39*

TUBE.

No. 6301.

Marks, $\frac{12\ R_{80}\ T}{B\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	0.	.....	
12,500	50,000	.001667	.000334	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	Elastic limit.
13,000	52,000	.003333	.001633	.....	.....	
13,250	53,000	.005000	.001667	.....	.....	
13,500	54,000	.008500	.003500	.....	.....	
13,750	55,000	.009000	.000500	.....	.....	
14,000	56,000	.010067	.001067	.....	.....	
22,120	88,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,480
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.10, ″.13, ″.38*

TUBE.

No. 6349.

Marks, $\frac{12\ R_{28}\ T}{B\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001300	.000133	0.	.....	
12,500	50,000	.001667	.000367	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	
13,250	53,000	.001767	.000034	.....	.....	
13,500	54,000	.001833	.000066	.....	.....	Elastic limit.
13,750	55,000	.001967	.000134	.....	.....	
14,000	56,000	.002200	.000233	.....	.....	
14,250	57,000	.002633	.000433	.....	.....	
14,500	58,000	.004333	.001700	.....	.....	
14,750	59,000	.005667	.001334	.....	.....	
15,000	60,000	.007833	.002166	.....	.....	
22,500	90,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,000
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001833
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1.″24 from neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.28*, ″.24*

JACKET.

No. 6063.

Marks, $\frac{10158\ B_3}{B\ T_1 M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	.....	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001200	.000200	0.	.....	
10,000	40,000	.001367	.000167	.....	.....	
10,500	42,000	.001467	.000100	0.	.....	
10,750	43,000	.001533	.000066	.....	.....	
11,000	44,000	.001567	.000034	.....	.....	
11,250	45,000	.001600	.000033	.....	.....	
11,500	46,000	.001633	.000033	.....	.....	
11,750	47,000	.001667	.000034	.....	.....	
12,000	48,000	.001700	.000033	.....	.....	Elastic limit.
12,250	49,000	.001867	.000167	.....	.....	
12,500	50,000	.002333	.000466	.....	.....	
12,750	51,000	.003267	.000934	.....	.....	
13,000	52,000	.003933	.000666	.....	.....	
13,250	53,000	.004600	.000667	.....	.....	
24,690	98,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	98.760
Elastic limit, per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.1833
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		86.4
Position of rupture		1".5 from neck
Character of broken surface		silky
Elongation of inch sections		".13, ".30*, ".12

JACKET.

No. 6105.

Marks, $\frac{12\ R_{24}\ J}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000833	.000800	.....	.....	
7,500	30,000	.000967	.000834	.....	.....	
8,750	35,000	.001133	.000166	0.	.....	
10,000	40,000	.001333	.000200	.....	.....	
10,500	42,000	.001400	.000067	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001433	0.	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001500	.000033	.....	.....	
11,750	47,000	.001533	.000033	.....	.....	
12,000	48,000	.001600	.000067	.....	.....	
12,250	49,000	.001633	.000033	.....	.....	
12,500	50,000	.001667	.000034	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	Elastic limit.
13,250	53,000	.012667	.010934	.....	.....	
13,500	54,000	.013333	.000666	.....	.....	
13,750	55,000	.014033	.000700	.....	.....	
14,000	56,000	.015167	.001134	.....	.....	
14,250	57,000	.016600	.001433	.....	.....	
21,810	87,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,240
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2367
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.074
Reduction in area after rupture, per cent of original section		24.6
Position of rupture		1″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.20, ″.36

JACKET.

No. 6288.

Marks, $\frac{12\ R_{20}\ J}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	.....	.....	
2,500	10,000	.000300	.000233	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001133	.000166	0.	0.	
10,000	40,000	.001300	.000167	.....	.....	
10,500	42,000	.001367	.000067	0.	.....	
10,750	43,000	.001400	.000033	.....	.....	
11,000	44,000	.001433	.000033	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001500	.000033	.....	.....	
11,750	47,000	.001533	.000033	.....	.....	
12,000	48,000	.001567	.000034	.....	.....	
12,250	49,000	.001600	.000033	.....	.....	
12,500	50,000	.001667	.000067	.....	.....	Elastic limit.
		.001800	.000133	.....	.....	
12,750	51,000	.002067	.000267	.....	.....	
13,000	52,000	.003600	.001533	.....	.....	
13,250	53,000	.005333	.001733	.....	.....	
13,500	54,000	.006667	.001334	.....	.....	
13,750	55,000	.007567	.000900	.....	.....	
22,390	89,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,560
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per cent of original section		30.6
Position of rupture		″.85 from neck
Character of broken surface		granular, 85 per cent; dull, flaky streak, 15 per cent
Elongation of inch sections		″.26*, ″.15, ″.12

TABULATION OF TENSION SPECIMENS FROM 12-INCH STEEL B. L. RIFLES (STEMS 3″ LONG, ″.564 DIAMETER.

Test No.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds	*Pounds.*	*P. ct.*	*P. ct.*		
5205	Tube	Middle.	45,000	89,280	19.7	41.9	Silky, oblique	Muzzle end.
6211	....do	Outside.	45,000	80,760	25.7	47.2	Silky.....	Do.
6258	....do	....do ...	35,000	80,080	23.3	49.7	.....do.....	Breech end.
6301	....do	....do ...	51,000	88,480	20.3	47.2	.....do.....	Do.
6349	....do	....do ...	54,000	90,000	21.0	47.2	.....do.....	Do.
6068	Jacket....	Middle.	48,000	98,760	18.3	36.4	.....do.....	Do.
6105	....do	Outside.	52,000	87,240	23.7	24.6	.....do.....	Muzzle end.
6288	....do	....do ...	50,000	89,560	17.7	30.6	Granular 85 per cent, dull flaky streak 15 per cent.	Do.

12-INCH STEEL B. L. RIFLES.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6090.

Marks, $\frac{11989\ B_2}{B\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001133	.000166	0.	.....	
10,000	40,000	.001300	.000167	.....	.....	
10,500	42,000	.001400	.000100	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001467	.000034	.....	.....	
11,250	45,000	.001533	.000066	.....	.....	
11,500	46,000	.001567	.000034	.....	.....	
11,750	47,000	.001633	.000066	.....	.....	Elastic limit.
12,000	48,000	.002000	.000367	.....	.....	
12,250	49,000	.003000	.001000	.....	.....	
12,500	50,000	.005833	.002833	.....	.....	
12,750	51,000	.006167	.000334	.....	.....	
13,000	52,000	.007000	.000833	.....	.....	
23,560	94,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,240
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		27.6
Position of rupture		".8 from neck
Character of broken surface		granular, radiating from a point in the circumference
Elongation of inch sections		".11, ".13, ".23*

TUBE.

No. 6076.

Marks, $\frac{11486\ B_1}{B\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	.....	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001083	.000866	.....	.....	
8,750	35,000	.001200	.000167	.....	.....	
10,000	40,000	.001400	.000200	.....	.....	
11,750	47,000	.001733	.000333	.....	.....	Elastic limit.
12,000	48,000	.001900	.000167	.....	.....	
12,250	49,000	.002267	.000367	.....	.....	
12,500	50,000	.003667	.001400	.....	.....	
12,750	51,000	.004667	.001000	.....	.....	
13,000	52,000	.006300	.001633	.....	.....	
22,730	90,920	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,920
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".6 from neck
Character of broken surface		silky
Elongation of inch sections		".16, ".35*, ".12

12-INCH B. L. RIFLED MORTARS.

TUBE.

No. 6134.

Marks, 1986 B_2 $M T_2$ M
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	0.	.....	
5,000	20,000	.000633	.000333	.000334	.....	
7,500	30,000	.000967	.000334	0.	.....	
8,750	35,000	.001100	.000133	0.	.....	
10,000	40,000	.001300	.000200	.000033	.....	
10,250	41,000	.001333	.000033	.000034	.....	
10,500	42,000	.001367	.000034	.000033	.....	
10,750	43,000	.001400	.000033	.000034	.....	Elastic limit.
11,000	44,000	.001433	.000034	.000066	.....	
11,250	45,000	.001467	.000066	.000467	.....	
11,500	46,000	.001533	.000467	.002667	.....	
11,750	47,000	.002000	.002667	.000833	.....	
12,000	48,000	.004667	.000833	.072033	.....	
12,250	49,000	.005500	.072033	.000534	.....	Tensile strength.
12,500	50,000	.007533	.000534	.....	.....	
12,750	51,000	.008067	.....	.....	.....	
22,180	88,720	.....	.....	.....	.....	

General summary.

Tensile strength per square inch of original section	pounds..	88,720
Elastic limit per square inch of original section	do....	46,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do....	.001533
Reduction in diameter at point of rupture	do....	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".5 from neck
Character of broken surface		silky
Elongation of inch sections		".14, ".34, ".10

TUBE.

No. 6301.

Marks, $^{12\ R_{80}\ T}_{B\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	0.	.....	
12,500	50,000	.001667	.000334	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	Elastic limit.
13,000	52,000	.003333	.001633	.....	.....	
13,250	53,000	.005000	.001667	.....	.....	
13,500	54,000	.008500	.003500	.....	.....	
13,750	55,000	.009000	.000500	.....	.....	
14,000	56,000	.010067	.001067	.....	.....	
22,120	88,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,480
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.10, ″.13, ″.38*

TUBE.

No. 6349.

Marks, $^{12}_{B}\ R_{T_1}\ ^{T}_{O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001300	.000133	0.	.....	
12,500	50,000	.001667	.000367	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	
13,250	53,000	.001767	.000034	.....	.....	
13,500	54,000	.001833	.000066	.....	.....	Elastic limit.
13,750	55,000	.001967	.000134	.....	.....	
14,000	56,000	.002200	.000233	.....	.....	
14,250	57,000	.002633	.000433	.....	.....	
14,500	58,000	.004333	.001700	.....	.....	
14,750	59,000	.005667	.001334	.....	.....	
15,000	60,000	.007833	.002166	.....	.....	
22,500	90,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,000
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001833
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1.″24 from neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.28*, ″.24*

TUBE.

No. 6182.

Marks, $\frac{12\ M\ R_{28}\ T}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000167	.000100	.....	.....	
5,000	20,000	.000467	.000300	.....	.....	
7,500	30,000	.000800	.000333	.....	.....	
8,750	35,000	.001033	.000233	0.	.....	
10,000	40,000	.001200	.000167	0.	.....	
12,750	51,000	.001667	.000467	.....	.....	
13,000	52,000	.001733	.000066	.....	.....	
13,250	53,000	.001800	.000067	.....	.....	Elastic limit.
13,500	54,000	.002367	.000567	.....	.....	
13,750	55,000	.004267	.001900	.....	.....	
14,000	56,000	.005833	.001566	.....	.....	
14,250	57,000	.007000	.001167	.....	.....	
14,500	58,000	.008333	.001333	.....	.....	
22,510	90,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,040
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per cent of original section		52.2
Position of rupture		".95 from neck
Character of broken surface		fine silky
Elongation of inch sections		".14, ".17, ".35*

JACKET.

No. 6105.

Marks, $\frac{12\ R_{24}\ J}{M\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000633	.000300	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001133	.000166	0.	.....	
10,000	40,000	.001333	.000200	.....	.....	
10,500	42,000	.001400	.000067	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001433	0.	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001500	.000033	.....	.....	
11,750	47,000	.001533	.000033	.....	.....	
12,000	48,000	.001600	.000067	.....	.....	
12,250	49,000	.001633	.000033	.....	.....	
12,500	50,000	.001667	.000034	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	Elastic limit.
13,250	53,000	.012667	.010934	.....	.....	
13,500	54,000	.013333	.000666	.....	.....	
13,750	55,000	.014033	.000700	.....	.....	
14,000	56,000	.015167	.001134	.....	.....	
14,250	57,000	.016600	.001433	.....	.....	
21,810	87,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,240
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2367
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.074
Reduction in area after rupture, per cent of original section		24.6
Position of rupture		1″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.20, ″.36″

JACKET.

No. 6288.

Marks, $\frac{12\ R_{2}\ J}{M\ T_{1}\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	.....	.....	
2,500	10,000	.000800	.000233	.....	.....	
5,000	20,000	.000633	.000833	.....	.....	
7,500	30,000	.000967	.000834	.....	.....	
8,750	35,000	.001133	.000166	0.	0.	
10,000	40,000	.001300	.000167	.....	.....	
10,500	42,000	.001367	.000067	0.	.....	
10,750	43,000	.001400	.000033	.....	.....	
11,000	44,000	.001433	.000033	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001500	.000033	.....	.....	
11,750	47,000	.001533	.000033	.....	.....	
12,000	48,000	.001567	.000034	.....	.....	
12,250	49,000	.001600	.000033	.....	.....	
12,500	50,000	.001667 .001800	.000067 .000133	.....	.....	Elastic limit.
12,750	51,000	.002067	.000267	.....	.....	
13,000	52,000	.008600	.001533	.....	.....	
13,250	53,000	.005333	.001733	.....	.....	
13,500	54,000	.006667	.001334	.....	.....	
13,750	55,000	.007567	.000900	.....	.....	
22,390	89,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,560
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per cent of original section		30.6
Position of rupture		".35 from neck
Character of broken surface		granular, 85 per cent; dull, flaky streak, 15 per cent
Elongation of inch sections		".26*, ".15, ".12

TABULATION OF TENSION SPECIMENS FROM 12-INCH STEEL B. L. RIFLES (STEMS 3" LONG, ".564 DIAMETER.

Test No.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds	*Pounds.*	*P. ct.*	*P. ct.*		
5205	Tube	Middle .	45,000	89,280	19.7	41.9	Silky, oblique	Muzzle end.
6211	....do	Outside.	45,000	80,760	25.7	47.2	Silky.....	Do.
6258	....do	....do ...	35,000	80,080	23.3	49.7	.....do.....	Breech end.
6301	....do	....do ...	51,000	88,480	20.3	47.2	.....do.....	Do.
6349	....do	....do ...	54,000	90,000	21.0	47.2	.....do.....	Do.
6063	Jacket....	Middle .	48,000	98,760	18.3	36.4	.....do.....	Do.
6105	....do	Outside.	52,000	87,240	23.7	24.6	.....do.....	Muzzle end.
6288	....do	....do ...	50,000	89,560	17.7	30.6	Granular 85 per cent, dull flaky streak 15 per cent.	Do.

12-INCH B. L. RIFLED MORTARS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 6218.

Marks, $\frac{12\,M\,R_{es}\,T}{B\,T_1\,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001133	.000166	0.	.....	
10,000	40,000	.001333	.000200	0.	.....	
10,250	41,000	.001367	.000034	.....	.....	
10,500	42,000	.001400	.000033	.....	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001500	.000067	.....	.....	Elastic limit.
11,250	45,000	.001767	.000267	.....	.....	
11,500	46,000	.005400	.003633	.....	.....	
11,750	47,000	.008200	.002800	.....	.....	
12,000	48,000	.008933	.000733	.....	.....	
12,250	49,000	.009767	.000834	.....	.....	
20,760	83,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,040
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per cent of original section		52.2
Position of rupture		"1.3 from neck
Character of broken surface		silky
Elongation of inch sections		".13, ".34*, ".23

TUBE.

No. 6090.

Marks, $\frac{11969\ B_2}{B\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001133	.000166	0.	.....	
10,000	40,000	.001300	.000167	.....	.....	
10,500	42,000	.001400	.000100	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001467	.000034	.....	.....	
11,250	45,000	.001533	.000066	.....	.....	
11,500	46,000	.001567	.000034	.....	.....	
11,750	47,000	.001633	.000066	.....	.....	Elastic limit.
12,000	48,000	.002000	.000867	.....	.....	
12,250	49,000	.003000	.001000	.....	.....	
12,500	50,000	.005333	.002333	.....	.....	
12,750	51,000	.006167	.000834	.....	.....	
13,000	52,000	.007000	.000833	.....	.....	
23,560	94,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,240
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		27.6
Position of rupture		".8 from neck
Character of broken surface		granular, radiating from a point in the circumference
Elongation of inch sections		".11, ".13, ".23*

TUBE.

No. 6246.

Marks, $\frac{12990\ B_1}{B\ T_5\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000833	.000283	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	0.	.....	
10,250	41,000	.001367	.000084	.....	.....	
10,500	42,000	.001400	.000033	.....	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001467	.000034	.....	.....	
11,250	45,000	.001533	.000066	.....	.....	Elastic limit.
11,500	46,000	.001667	.000134	.....	.....	
11,750	47,000	.005433	.003766	.....	.....	
12,000	48,000	.006333	.000900	.....	.....	
12,250	49,000	.007033	.000700	.....	.....	
12,500	50,000	.008300	.001267	.....	.....	
21,810	87,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,240
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.15, ″.39*, ″.15

TUBE.

No. 6134.

Marks, $\frac{11966\ B_2}{M\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001100	.000133	0.	.....	
10,000	40,000	.001300	.000200	0.	.....	
10,250	41,000	.001333	.000033	.....	.....	
10,500	42,000	.001367	.000034	.....	.....	
10,750	43,000	.001400	.000033	.....	.....	
11,000	44,000	.001433	.000033	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001533	.000066	.....	.....	Elastic limit.
11,750	47,000	.002000	.000467	.....	.....	
12,000	48,000	.004667	.002667	.....	.....	
12,250	49,000	.005500	.000833	.....	.....	
12,500	50,000	.007533	.002033	.....	.....	
12,750	51,000	.008067	.000534	.....	.....	
22,180	88,720	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,720
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".5 from neck
Character of broken surface		silky
Elongation of inch sections		".14, ".34*, ".10

TUBE.

No. 6246.

Marks, $\frac{12990\ B_1}{B\ T_5\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	0.	.....	
10,250	41,000	.001367	.000034	.....	.....	
10,500	42,000	.001400	.000033	.....	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001467	.000034	.....	.....	
11,250	45,000	.001533	.000066	.....	.....	Elastic limit.
11,500	46,000	.001667	.000134	.....	.....	
11,750	47,000	.005433	.003766	.....	.....	
12,000	48,000	.006333	.000900	.....	.....	
12,250	49,000	.007033	.000700	.....	.....	
12,500	50,000	.008300	.001267	.....	.....	
21,810	87,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,240
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".15, ".39*, ".15

TUBE.

No. 6254.

Marks, $\frac{12\ M\ R_{II}\ T}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	.....	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001067	.000134	0.	.....	
10,000	40,000	.001267	.000200	0.	.....	
12,500	50,000	.001600	.000333	.....	.....	
12,750	51,000	.001633	.000033	.....	.....	
13,000	52,000	.001667	.000034	.....	.....	
13,250	53,000	.001700	.000033	.....	.....	
13,500	54,000	.001733	.000033	.....	.....	
13,750	55,000	.001767	.000034	.....	.....	
14,000	56,000	.001800	.000033	.....	.....	
14,250	57,000	.001833	.000033	.....	.....	
14,500	58,000	.001867	.000034	.....	.....	
14,750	59,000	.001933	.000066	.....	.....	Elastic limit.
15,000	60,000	.003267	.001334	.....	.....	
15,250	61,000	.006367	.003100	.....	.....	
15,500	62,000	.007333	.000966	.....	.....	
15,750	63,000	.008367	.001034	.....	.....	
16,000	64,000	.009667	.001300	.....	.....	
24,020	96,080	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,080
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001933
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		".75 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".36*, ".14, ".13

TUBE.

No. 6194.

Marks, $\frac{12549\ B_2}{M\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001100	.000167	0.	.....	
10,000	40,000	.001267	.000167	0.	.....	
11,000	44,000	.001400	.000133	.....	.....	
11,250	45,000	.001433	.000033	.....	.....	
11,500	46,000	.001467	.000034	.....	.....	
11,750	47,000	.001533	.000066	.....	.....	Elastic limit.
12,000	48,000	.001667	.000134	.....	.....	
12,250	49,000	.002367	.000700	.....	.....	
12,500	50,000	.004767	.002400	.....	.....	
12,750	51,000	.005200	.000433	.....	.....	
13,000	52,000	.006533	.001333	.....	.....	
22,370	89,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,480
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2233
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".3 from neck
Character of broken surface		silky
Elongation of inch sections		".12, ".32, ".28

TUBE.

No. 6212.

Marks, $\frac{12\ M\ R_{sw}\ T}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	.....	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.001000	.000367	.....	.....	
8,750	35,000	.001167	.000167	.....	.....	
10,000	40,000	.001400	.000233	.000067	.000067	Elastic limit.
10,250	41,000	.001667	.000267	.....	.....	
10,500	42,000	.001933	.000266	.....	.....	
10,750	43,000	.002200	.000267	.....	.....	
11,000	44,000	.002367	.000167	.....	.....	
11,250	45,000	.004733	.002366	.....	.....	
20,970	83,880	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,880
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.2433
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per cent of original section	.....	52.2
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".13, ".20, ".40*

TUBE.

No. 6218.

Marks, $\frac{12\,M\,R_{2}\,T}{B\,T_{1}\,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000833	.000833	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001133	.000166	0.	.....	
10,000	40,000	.001333	.000200	0.	.....	
10,250	41,000	.001367	.000034	.....	.....	
10,500	42,000	.001400	.000033	.....	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001500	.000067	.....	.....	Elastic limit.
11,250	45,000	.001767	.000067	.....	.....	
11,500	46,000	.005400	.003633	.....	.....	
11,750	47,000	.008200	.002800	.....	.....	
12,000	48,000	.008933	.000733	.....	.....	
12,250	49,000	.009767	.000834	.....	.....	
20,760	83,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,040
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per cent of original section		52.2
Position of rupture		"1.3 from neck
Character of broken surface		silky
Elongation of inch sections		".13, ".34, ".23

TUBE.

No. 6230.

Marks, $\frac{13069\ B_1}{B\ T,\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000833	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001033	.000366	.....	.....	
8,750	35,000	.001200	.000167	0.	.....	
10,000	40,000	.001367	.000167	0.	.....	
11,000	44,000	.001533	.000166	.....	.....	
11,250	45,000	.001567	.000034	.....	.....	
11,500	46,000	.001633	.000066	.....	.....	
11,750	47,000	.001667	.000034	.....	.....	
12,000	48,000	.001733	.000066	.....	.....	Elastic limit.
12,250	49,000	.004467	.002734	.....	.....	
12,500	50,000	.005333	.000866	.....	.....	
12,750	51,000	.005733	.000400	.....	.....	
13,000	52,000	.007100	.001367	.....	.....	
13,250	53,000	.007667	.000567	.....	.....	
22,850	91,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,400
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".7 from neck
Character of broken surface		silky
Elongation of inch sections		".16, ".36*, ".14

TUBE.

No. 6246.

Marks, $\frac{12990\ B_1}{B\ T_5\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000833	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	0.	.....	
10,250	41,000	.001367	.000034	.....	.....	
10,500	42,000	.001400	.000033	.....	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001467	.000034	.....	.....	
11,250	45,000	.001533	.000066	.....	.....	Elastic limit.
11,500	46,000	.001667	.000134	.....	.....	
11,750	47,000	.005433	.003766	.....	.....	
12,000	48,000	.006333	.000900	.....	.....	
12,250	49,000	.007033	.000700	.....	.....	
12,500	50,000	.008300	.001267	.....	.....	
21,810	87,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,240
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".15, ".39*, ".15

TUBE.

No. 6254.

Marks, $\frac{12\ M\ R_{II}\ T}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	.....	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001067	.000134	0.	.....	
10,000	40,000	.001267	.000200	0.	.....	
12,500	50,000	.001600	.000333	.....	.....	
12,750	51,000	.001633	.000033	.....	.....	
13,000	52,000	.001667	.000034	.....	.....	
13,250	53,000	.001700	.000033	.....	.....	
13,500	54,000	.001733	.000033	.....	.....	
13,750	55,000	.001767	.000034	.....	.....	
14,000	56,000	.001800	.000033	.....	.....	
14,250	57,000	.001833	.000033	.....	.....	
14,500	58,000	.001867	.000034	.....	.....	
14,750	59,000	.001933	.000066	.....	.....	Elastic limit.
15,000	60,000	.008267	.001334	.....	.....	
15,250	61,000	.006367	.008100	.....	.....	
15,500	62,000	.007333	.000966	.....	.....	
15,750	63,000	.008367	.001034	.....	.....	
16,000	64,000	.009667	.001300	.....	.....	
24,020	96,080	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,080
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001933
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		".75 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".36*, ".14, ".13

TUBE.

No. 6259.

Marks, $\frac{12\ M\ R_{73}\ T}{B\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.001000	.000367	.....	.....	
8,750	35,000	.001267	.000267	.000067	.000067	
10,000	40,000	.001433	.000166	.000100	.000033	Elastic limit.
10,250	41,000	.001533	.000100	.....	.....	
10,500	42,000	.001667	.000134	.....	.....	
10,750	43,000	.002000	.000333	.....	.....	
11,000	44,000	.003667	.001667	.....	.....	
11,250	45,000	.004667	.001000	.....	.....	
11,500	46,000	.006600	.001933	.....	.....	
20,410	81,640	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,640
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001433
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per cent of original section		54.6
Position of rupture		1".05 from neck
Character of broken surface		silky
Elongation of inch sections		".12, ".17, ".40*

TUBE.

No. 6295.

Marks, $\frac{12\ M\ R_{80}\ T}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000300	.000167	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.001000	.000367	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001300	.000133	0.	.....	
10,250	41,000	.001333	.000033	.....	.....	
10,500	42,000	.001367	.000034	.....	.....	
10,750	43,000	.001400	.000033	.....	.....	
11,000	44,000	.001433	.000033	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001533	.000066	.....	.....	
11,750	47,000	.001567	.000034	.....	.....	
12,000	48,000	.001600	.000033	.....	.....	
12,250	49,000	.001633	.000033	.....	.....	
12,500	50,000	.001667	.000034	.....	.....	
12,750	51,000	.001733	.000066	.....	.....	Elastic limit.
13,000	52,000	.002333	.000600	.....	.....	
13,250	53,000	.003000	.000667	.....	.....	
13,500	54,000	.006000	.003000	.....	.....	
13,750	55,000	.007333	.001333	.....	.....	
14,000	56,000	.008333	.001000	.....	.....	
22,180	88,720	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,720
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		".85 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".15, ".37*

TUBE.

No. 6300.

Marks, $\frac{12\ M\ R_{II}\ T}{B\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001100	.000167	0.	.....	
10,000	40,000	.001300	.000200	0.	.....	
10,250	41,000	.001333	.000033	.....	.....	
10,500	42,000	.001367	.000034	.....	.....	
10,750	43,000	.001400	.000033	.....	.....	Elastic limit.
11,000	44,000	.001633	.001633	.....	.....	
11,250	45,000	.003900	.000867	.....	.....	
11,500	46,000	.004667	.000767	.....	.....	
11,750	47,000	.005833	.001166	.....	.....	
12,000	48,000	.007333	.001500	.....	.....	
20,410	81,640	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,640
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.35*, ″.17, ″.08

TUBE.

No. 6324.

Marks, $\frac{14182\ B_2}{B\ T_5\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001033	.000366	.....	.....	
8,750	35,000	.001200	.000167	0.	.....	
10,000	40,000	.001367	.000167	0.	.....	
10,250	41,000	.001400	.000033	.....	.....	
10,500	42,000	.001467	.000067	.....	.....	
10,750	43,000	.001533	.000066	.....	.....	
11,000	44,000	.001600	.000067	.....	.....	
11,250	45,000	.001633	.000033	.....	.....	
11,500	46,000	.001667	.000034	.....	.....	
11,750	47,000	.001700	.000033	.....	.....	
12,000	48,000	.001733	.000033	.....	.....	
12,250	49,000	.001767	.000034	.....	.....	Elastic limit.
12,500	50,000	.004033	.002266	.....	.....	
12,750	51,000	.007833	.003800	.....	.....	
13,000	52,000	.008600	.000767	.....	.....	
13,250	53,000	.009267	.000667	.....	.....	
13,500	54,000	.010333	.001066	.....	.....	
22,390	89,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,560
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".87 from neck
Character of broken surface		silky
Elongation of inch sections		".16, ".32, ".22

TUBE.

No. 6352.

Marks, $\frac{14561\ B_1}{M\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000833	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001167	.000200	0.	.....	
10,000	40,000	.001333	.000166	0.	.....	
12,000	48,000	.001633	.000300	.....	.....	
12,250	49,000	.001700	.000067	.....	.....	Elastic limit.
12,500	50,000	.005633	.003933	.....	.....	
12,750	51,000	.006767	.001134	.....	.....	
13,000	52,000	.007400	.000633	.....	.....	
13,250	53,000	.008033	.000633	.....	.....	
13,500	54,000	.009267	.001234	.....	.....	
23,100	92,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,400
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".4 from neck
Character of broken surface		silky
Elongation of inch sections		".18 ".33* ".15

TUBE.

No. 6366.

Marks, $\frac{14493\ B_2}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.001000	.000367	.....	.....	
8,750	35,000	.001200	.000200	.000033	.000033	
10,000	40,000	.001367	.000167	.000033	0.	
11,500	46,000	.001633	.000266	.....	.....	Elastic limit.
11,750	47,000	.001767	.000134	.....	.....	
12,000	48,000	.005667	.003900	.....	.....	
12,250	49,000	.006600	.000933	.....	.....	
12,500	50,000	.007700	.001100	.....	.....	
12,750	51,000	.008433	.000733	.....	.....	
22,030	88,120	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,120
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".16, ".41*, ".15

JACKET.

No. 6365.

Marks, $\frac{14587\ B}{M\ T.\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000667	.000667	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	.....	.....	
10,500	42,000	.001400	.000067	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001467	.000034	.....	.....	
11,250	45,000	.001533	.000066	.....	.....	
11,500	46,000	.001567	.000034	.....	.....	
11,750	47,000	.001600	.000033	.....	.....	Elastic limit.
12,000	48,000	.001700	.000100	.....	.....	
12,250	49,000	.002000	.000300	.....	.....	
12,500	50,000	.005267	.003267	.....	.....	
12,750	51,000	.005667	.000400	.....	.....	
13,000	52,000	.006667	.001000	.....	.....	
23,910	95,640	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,640
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per cent of original section		30.6
Position of rupture		1.″6 from neck
Character of broken surface		granular 70 per cent, silky 30 per cent
Elongation of inch sections		″.14, ″.28*, ″.14

JACKET.

No. 6078.

Marks, $\frac{11766\ B.}{M\ T.\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001133	.000133	0.	.....	
10,000	40,000	.001300	.000167	.....	.....	
10,500	42,000	.001367	.000067	0.	.....	
10,750	43,000	.001400	.000033	.....	.....	
11,000	44,000	.001433	.000033	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001500	.000033	.....	.....	
11,750	47,000	.001533	.000033	.....	.....	
12,000	48,000	.001567	.000034	.....	.....	
12,250	49,000	.001633	.000066	.....	.....	Elastic limit.
12,500	50,000	.006733	.004100	.....	.....	
12,750	51,000	.006500	.000767	.....	.....	
13,000	52,000	.007333	.000833	.....	.....	
13,250	53,000	.008000	.000667	.....	.....	
13,500	54,000	.009100	.001100	.....	.....	
22,820	91,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,280
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2067
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		1".2 from neck
Character of broken surface		silky 80 per cent, granular, 20 per cent
Elongation of inch sections		".14, ".22, ".26*

JACKET.

No. 6089.

Marks, $\frac{11766\ B_2}{B\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000667	.000667	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	.....	.....	
10,500	42,000	.001409	.000067	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	Elastic limit.
11,000	44,000	.001533	.000100	.....	.....	
11,250	45,000	.002033	.000500	.....	.....	
11,500	46,000	.004000	.001967	.....	.....	
11,750	47,000	.006333	.002333	.....	.....	
12,000	48,000	.007000	.000667	.....	.....	
22,310	89,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,240
Elastic limit per square inch of original section	.do...	43,000
Elongation per inch after rupture	inch..	.2233
Elongation per inch under strain at elastic limit	.do...	.001433
Reduction in diameter at point of rupture	.do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".2 from neck
Character of broken surface		silky
Elongation of inch sections		".30*, ".20, ".17

JACKET.

No. 6109.

Marks, $\frac{11768\ B_3}{B\ T_4\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000367	.000234	.....	.....	
5,000	20,000	.000733	.000366	.....	.....	
7,500	30,000	.001100	.000367	.....	.....	
8,750	35,000	.001267	.000167	0.	.....	
10,000	40,000	.001433	.000166	.....	.....	
10,500	42,000	.001533	.000100	.000033	.000033	
10,750	43,000	.001600	.000067	.....	.....	
11,000	44,000	.001633	.000033	.....	.....	
11,250	45,000	.001667	.000034	.....	.....	
11,500	46,000	.001733	.000066	.....	.....	
11,750	47,000	.001800	.000067	.....	.....	Elastic limit.
12,000	48,000	.002000	.000200	.....	.....	
12,250	49,000	.003333	.001333	.....	.....	
12,500	50,000	.005000	.001667	.....	.....	
12,750	51,000	.005367	.000367	.....	.....	
13,000	52,000	.006400	.001033	.....	.....	
23,810	95,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,240
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.13, ″.16, ″.29*

JACKET.

No. 6151.

Marks, $\frac{11914\ B_2}{M\ T_2\ M}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000600	.000800	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001100	.000167	0.	.....	
10,000	40,000	.001333	.000233	.....	.....	
10,500	42,000	.001400	.000067	0.	.....	
10,750	43,000	.001400	0.	.....	.....	
11,000	44,000	.001433	.000033	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001500	.000033	.....	.....	Elastic limit.
11,750	47,000	.001667	.000167	.....	.....	
12,000	48,000	.002100	.000433	.....	.....	
12,250	49,000	.002867	.000267	.....	.....	
12,500	50,000	.003867	.001000	.....	.....	
12,750	51,000	.004067	.000700	.....	.....	
22,940	91,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,760
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		1".3 from neck
Character of broken surface		granular; radiating from a silky spot at the circumference
Elongation of inch sections		".14, ".26*, ".21

JACKET.

No. 6154.

Marks, $\frac{11497\ B_2}{B\ T_{14}\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001033	.000366	.....	.....	
8,750	35,000	.001233	.000200	.....	.....	
10,000	40,000	.001400	.000167	.....	.....	
10,500	42,000	.001533	.000133	0.	.....	
10,750	43,000	.001533	0.	.....	.....	
11,000	44,000	.001567	.000084	.....	.....	
11,250	45,000	.001600	.000083	.....	.....	
11,500	46,000	.001633	.000083	.....	.....	Elastic limit.
11,750	47,000	.001867	.000284	.....	.....	
12,000	48,000	.002167	.000300	.....	.....	
12,250	49,000	.002867	.000700	.....	.....	
12,500	50,000	.004500	.001633	.....	.....	
12,750	51,000	.005100	.000600	.....	.....	
23,140	92,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,560
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		".90 from neck
Character of broken surface		silky
Elongation of inch sections		".32", ".17, ".15

JACKET.

No. 6166.

Marks, $\frac{12202\ B_2}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000833	.000166	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	.....	.....	
10,500	42,000	.001400	.000067	.000033	.000033	
10,750	43,000	.001467	.000067	.....	.....	
11,000	44,000	.001533	.000066	.....	.....	
11,250	45,000	.001567	.000034	.....	.....	Elastic limit.
11,500	46,000	.002567	.001000	.....	.....	
11,750	47,000	.004333	.001766	.....	.....	
12,000	48,000	.005667	.001334	.....	.....	
12,250	49,000	.006567	.000900	.....	.....	
12,500	50,000	.007567	.001000	.....	.....	
12,750	51,000	.008500	.000933	.....	.....	
21,790	87,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,160
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001567
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per cent of original section		36.4
Position of rupture		".22 inch from neck
Character of broken surface		fine granular, silky spot at the circumference
Elongation of inch sections		".25", ".25", ".13

JACKET.

No. 6193.

Marks, $\frac{12\ M\ B_{86}\ J}{B\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000967	.000367	.....	.....	
8,750	35,000	.001133	.000166	.000033	.000033	
10,000	40,000	.001333	.000200	.....	.....	
10,500	42,000	.001400	.000067	.000033	0.	
12,500	50,000	.001733	.000333	.....	.....	
12,750	51,000	.001767	.000034	.....	.....	
13,000	52,000	.001800	.000033	.....	.....	
13,250	53,000	.001833	.000033	.....	.....	
13,500	54,000	.001867	.000034	.....	.....	
13,750	55,000	.001900	.000033	.....	.....	
14,000	56,000	.001967	.000067	.....	.....	
14,250	57,000	.002000	.000033	.....	.....	
14,500	58,000	.002033	.000033	.....	.....	
14,750	59,000	.002067	.000034	.....	.....	
15,000	60,000	.002100	.000033	.....	.....	
15,250	61,000	.002167	.000067	.....	.....	Elastic limit.
15,500	62,000	.002267	.000100	.....	.....	
15,750	63,000	.002400	.000133	.....	.....	
16,000	64,000	.003000	.000600	.....	.....	
16,250	65,000	.005733	.002733	.....	.....	
16,500	66,000	.007167	.001434	.....	.....	
24,120	96,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,480
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002167
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1".4 from neck
Character of broken surface		silky
Elongation of inch sections		".09, ".31*, ".16

JACKET.

No. 6203.

Marks, $\frac{12\ M\ R_{el}\ J.}{M\ T\ O.}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000833	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001033	.000866	.....	.....	
8,750	35,000	.001200	.000167	0.	.....	
10,000	40,000	.001367	.000167	.....	.....	
10,500	42,000	.001400	.000033	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44.000	.001467	.000034	.....	.....	
11,250	45,000	.001533	.000066	.....	.....	
11,500	46,000	.001600	.000067	.....	.....	
11,750	47,080	.001667	.000067	.....	.....	Elastic limit.
12,000	48,000	.011400	.009733	.....	.....	
12,250	49,000	.012333	.000933	.....	.....	
12,500	50,000	.013500	.001167	.....	.....	
12,750	51,000	.014333	.000833	.....	.....	
13,000	52,000	.015433	.001100	.....	.....	
21,140	84,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,560
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2467
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per cent of original section		52.2
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".40*, ".19, ".15

JACKET.

No. 6204.

Marks, $\frac{12513\ B_2}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000367	.000234	.....	.....	
5,000	20,000	.000700	.000333	.....	.....	
7,500	30,000	.001033	.000333	.....	.....	
8,750	35,000	.001233	.000200	0.	.....	
10,000	40,000	.001433	.000200	.....	.....	
10,500	42,000	.001500	.000067	.000033	.000033	
10,750	43,000	.001567	.000067	.....	.....	
11,000	44,000	.001600	.000033	.....	.....	
11,250	45,000	.001633	.000033	.....	.....	
11,500	46,000	.001667	.000034	.....	.....	
11,750	47,000	.001700	.000033	.....	.....	Elastic limit.
12,000	48,000	.004367	.002667	.....	.....	
12,250	49,000	.004833	.000466	.....	.....	
12,500	50,000	.005500	.000667	.....	.....	
12,750	51,000	.006333	.000833	.....	.....	
13,000	52,000	.007167	.000834	.....	.....	
23,620	94,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,480
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		1.″8 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		″.17, ″.27⁸, ″.13

JACKET.

No. 6210.

Marks, $\frac{12\ M\ R_{ss}\ J}{B\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001200	.000200	.000083	.000083	
10,000	40,000	.001367	.000167	.....	.....	
10,500	42,000	.001433	.000066	.000067	.000084	
10,750	23,000	.001500	.000067	.....	.....	
11,000	44,000	.001567	.000067	.....	.....	Elastic limit.
11,250	45,000	.006000	.004433	.....	.....	
11,500	46,000	.010167	.004167	.....	.....	
11,750	47,000	.011333	.001166	.....	.....	
12,000	48,000	.012000	.000667	.....	.....	
12,250	49,000	.012500	.000500	.....	.....	
21,180	84,720	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,720
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2367
Elongation per inch under strain at elastic limit	do...	.001567
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".15, ".42*, ".14

JACKET.

No. 6213.

Marks, $\frac{12\ M\ R_{os}\ J}{B\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001133	.000166	0.	.....	
10,000	40,000	.001300	.000167	.....	.....	
10,500	42,000	.001367	.000067	0.	.....	
10,750	43,000	.001400	.000033	.....	.....	
11,000	44,000	.001433	.000033	.....	.....	
11,250	45,000	.001467	.000034	.....	.....	
11,500	46,000	.001500	.000033	.....	.....	
11,750	47,000	.001533	.000033	.....	.....	
12,000	48,000	.001600	.000067	.....	.....	
12,250	49,000	.001633	.000033	.....	.....	
12,500	50,000	.001667	.000034	.....	.....	
12,750	51,000	.001667	0.	.....	.....	
13,000	52,000	.001700	.000033	.....	.....	
13,250	53,000	.001733	.000033	.....	.....	
13,500	54,000	.001767	.000034	.....	.....	
13,750	55,000	.001800	.000033	.....	.....	
14,000	56,000	.001833	.000033	.....	.....	
14,250	57,000	.001900	.000067	.....	.....	
14,500	58,000	.001933	.000033	.....	.....	
14,750	59,000	.002000	.000067	.....	.....	Elastic limit.
15,000	60,000	.007833	.005833	.....	.....	
15,250	61,000	.008333	.000500	.....	.....	
15,500	62,000	.009100	.000767	.....	.....	
15,750	63,000	.010100	.001000	.....	.....	
16,000	64,000	.011667	.001567	.....	.....	
23,710	94,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,840
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain of elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.28 from neck
Character of broken surface		silky
Elongation of inch sections		″.28, ″.28, ″.12

JACKET.

No. 6220.

Marks, $\frac{12372\ B}{B\ T,\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000300	.000167			
5,000	20,000	.000633	.000333			
7,500	30,000	.000967	.000334			
8,750	35,000	.001100	.000133	0.		
10,000	40,000	.001300	.000200			
10,500	42,000	.001333	.000033	0.		
10,750	43,000	.001367	.000034			
11,000	44,000	.001400	.000033			
11,250	45,000	.001433	.000033			
11,500	46,000	.001467	.000034			
11,750	47,000	.001500	.000033			Elastic limit.
12,000	48,000	.001667	.000967			
		.005000	.003433			
12,250	49,000	.007833	.002833			
12,500	50,000	.008700	.000867			
12,750	51,000	.009667	.000967			
13,000	52,000	.010333	.000666			
22,140	88,560					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,560
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".31*, ".16, ".11

JACKET.

No. 6255.

Marks, $\frac{12\ M\ B_{75}\ J}{M\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3."

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000633	.000333	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
8,750	35,000	.001100	.000133	0.	.....	
10,000	40,000	.001300	.000200	.....	.....	
10,500	42,000	.001367	.000067	0.	.....	
12,500	50,000	.001667	.000300	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001733	.000033	.....	.....	
13,250	53,000	.001767	.000034	.....	.....	
13,500	54,000	.001867	.000100	.....	.....	
13,750	55,000	.001900	.000033	.....	.....	Elastic limit.
14,000	56,000	.004333	.002400	.....	.....	
14,250	57,000	.009000	.004667	.....	.....	
14,500	58,000	.009667	.000667	.....	.....	
14,750	59,000	.010533	.000866	.....	.....	
15,000	60,000	.011600	.001067	.....	.....	
22,880	91,520	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,520
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture..	inch..	.2933
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1".25 from neck
Character of broken surface		fine silky
Elongation of inch sections		".26, ".28, ".14

JACKET.

No. 6256.

Marks, $\frac{12\ M\ B_{TS}\ J}{B\ T_1\ O}$
Diameter, ".564.
Sectional area .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000833	.000200	.....	.....	
5,000	20,000	.000700	.000867	.....	.....	
7,500	30,000	.001033	.000833	.....	.....	
8,750	35,000	.001200	.000167	0.	.....	
10,000	40,000	.001367	.000167	.....	.....	
10,500	42,000	.001457	.000100	.000083	.000083	
12,000	48,000	.001667	.000200	.....	.....	
12,250	49,000	.001700	.000033	.....	.....	
12,500	50,000	.001733	.000033	.....	.....	
12,750	51,000	.001767	.000034	.....	.....	
13,000	52,000	.001800	.000033	.....	.....	
13,250	53,000	.001833	.000033	.....	.....	Elastic limit.
13,500	54,000	.002067	.000234	.....	.....	
13,750	55,000	.002367	.000800	.....	.....	
14,000	56,000	.004500	.002133	.....	.....	
14,250	57,000	.007983	.003483	.....	.....	
14,500	58,000	.008667	.000734	.....	.....	
23,100	92,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,400
Elastic limit per square inch of original section	do...	53,000
Elongation per inch rupture	inch...	.2467
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.164
Reduction of area after rupture, per cent of original section		49.7
Position of rupture		1".4 from neck
Character of broken surface		fine silky
Elongation of inch sections		".21, ".39*, ".14

JACKET.

No. 6260.

Marks, $\frac{12513\ B_2}{M\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001133	.000133	0.	.....	
10,000	40,000	.001333	.000200	.....	.....	
10,500	42,000	.001400	.000067	0.	.....	
11,500	46,000	.001567	.000167	.....	.....	
11,750	47,000	.001600	.000033	.....	.....	
12,000	48,000	.001667	.000067	.....	.....	
12,250	49,000	.001700	.000033	.....	.....	Elastic limit.
12,500	50,000	.003767	.002067	.....	.....	
12,750	51,000	.004700	.000933	.....	.....	
13,000	52,000	.005633	.000933	.....	.....	
13,250	53,000	.006067	.000434	.....	.....	
13,500	54,000	.007367	.001300	.....	.....	
24,180	96,520	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,520
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.1903
Elongation per inch under strain at elastic limit	do...	.001704
Reduction in diameter at point of rupture	do...	.143
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		".85 from neck
Character of broken surface		silky
Elongation of inch sections		".15, ".12, ".31*

JACKET.

No. 6296.

Marks, $\frac{12\ M\ R_{28}\ J}{B\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000800	.000233	.....	.....	
5,000	20,000	.000600	.000300	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001133	.000200	0.	.....	
10,000	40,000	.001267	.000134	.....	.....	
10,500	42,000	.001333	.000066	0.	.....	
12,500	50,000	.001600	.000267	.....	.....	
12,750	51,000	.001633	.000033	.....	.....	
13,000	52,000	.001667	.000034	.....	.....	
13,250	53,000	.001733	.000066	.....	.....	
13,500	54,000	.001767	.000034	.....	.....	
13,750	55,000	.001800	.000033	.....	.....	
14,000	56,000	.001833	.000033	.....	.....	Elastic limit.
14,250	57,000	.002000	.000167	.....	.....	
14,500	58,000	.003500	.001500	.....	.....	
14,750	59,000	.006000	.002500	.....	.....	
15,000	60,000	.008333	.002333	.....	.....	
15,250	61,000	.009600	.001267	.....	.....	
22,600	90,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,400
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001833
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		".95 from neck
Character of broken surface		silky
Elongation of inch sections		".10, ".15, ".86*

JACKET.

No. 6302.

Marks, $\frac{12\ M\ R_{ss}\ J}{B\ T_1\ O}$
Diameter, ".568.
Sectional area, .253 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
253	1,000	0.	0.	0.	0.	Initial load
1,265	5,000	.000133	.000133	0.	.....	
2,530	10,000	.000333	.000200	.....	.....	
5,060	20,000	.000667	.000334	.....	.....	
7,590	30,000	.001000	.000333	.....	.....	
8,855	35,000	.001200	.000200	0.	.....	
10,120	40,000	.001367	.000167	.....	.....	
10,626	42,000	.001400	.000083	0.	.....	
12,650	50,000	.001700	.000300	.....	.....	
12,908	51,000	.001733	.000033	.....	.....	
13,156	52,000	.001767	.000034	.....	.....	
13,409	53,000	.001833	.000066	.....	.....	
13,662	54,000	.001933	.000100	.....	.....	
13,915	55,000	.001967	.000034	.....	.....	
14,168	56,000	.002000	.000033	.....	.....	
14,421	57,000	.002033	.000033	.....	.....	Elastic limit.
14,674	58,000	.002167	.000134	.....	.....	
14,927	59,000	.002433	.000266	.....	.....	
15,180	60,000	.005000	.002567	.....	.....	
15,433	61,000	.007367	.002367	.....	.....	
15,686	62,000	.008667	.001300	.....	.....	
23,920	94,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,550
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.2067
Elongation per inch under strain at elastic limit	do...	.002033
Reduction in diameter at point of rupture	do...	.148
Reduction in area after rupture, per cent of original section		45.8
Position of rupture		1".4 from neck
Character of broken surface		silky
Elongation of inch sections		".12, ".34*, ".16

JACKET.

No. 6323.

Marks, $\frac{12438\ B}{M\ T,\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001200	.000200	0.	.....	
10,000	40,000	.001367	.000167	.....	.....	
10,500	42,000	.001433	.000066	.000033	.000033	
10,750	43,000	.001467	.000034	.....	.....	
11,000	44,000	.001533	.000066	.....	.....	
11,250	45,000	.001567	.000034	.....	.....	
11,500	46,000	.001633	.000066	.....	.....	Elastic limit.
11,750	47,000	.001967	.000334	.....	.....	
12,000	48,000	.004000	.002033	.....	.....	
12,250	49,000	.007000	.003000	.....	.....	
12,500	50,000	.007667	.000667	.....	.....	
12,750	51,000	.008233	.000566	.....	.....	
22,940	91,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,760
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		at middle of stem
Character of broken surface		silky. Opened crack in surface of stem
Elongation of inch sections		".20, ".33*, ".12

JACKET.

No. 6392.

Marks, $\frac{14594\ B_1}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000533	.000333	.....	.....	
7,500	30,000	.001000	.000867	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	.....	.....	
10,500	42,000	.001400	.000067	0.	.....	
12,000	48,000	.001667	.000267	.....	.....	
12,250	49,000	.001700	.000033	.....	.....	Elastic limit.
12,500	50,000	.002700	.001000	.....	.....	
12,750	51,000	.004333	.001633	.....	.....	
13,000	52,000	.004967	.000634	.....	.....	
13,250	53,000	.005833	.000866	.....	.....	
13,500	54,000	.006667	.001334	.....	.....	
24,790	99,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,160
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.1800
Elongation per inch under strain at elastic limit	do...	.001760
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		1".6 from neck
Character of broken surface		silky. Trace of granulation
Elongation of inch sections		".12, ".31*, ".11

JACKET.

No. 6404.

Marks, $\frac{11927\ B}{M\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000300	.000167	.....	.....	
5,000	20,000	.000667	.000367	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
10,000	40,000	.001333	.000166	.....	.....	
10,500	42,000	.001400	.000067	0.	.....	
10,750	43,000	.001433	.000033	.....	.....	
11,000	44,000	.001500	.000067	.....	.....	
11,250	45,000	.001567	.000067	.....	.....	
11,500	46,000	.001600	.000033	.....	.....	
11,750	47,000	.001633	.000033	.....	.....	Elastic limit.
12,000	48,000	.002000	.000367	.....	.....	
12,250	49,000	.002367	.000367	.....	.....	
12,500	50,000	.002600	.000233	.....	.....	
12,750	51,000	.004267	.001667	.....	.....	
13,000	52,000	.005100	.000833	.....	.....	
23,710	94,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,840
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per cent of original section		36.4
Position of rupture		1".3 from neck
Character of broken surface		silky, 45 per cent, granular, 55 per cent
Elongation of inch sections		".13, ".27*, .".20

TABULATION OF TENSION SPECIMENS FROM 12-INCH B. L. RIFLED MORTARS (STEMS 3″ LONG, ″.564 DIAMETER).

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Per ct.*	*Per ct.*		
6090	Tube ...	Middle .	47,000	94,240	15.7	27.6	Granular, radiating from a point in the circumference.	Breech end.
6076	....do ...	....do ...	47,000	90,920	21.0	44.6	Silky.....	Do.
6134	....do ...	....do ...	46,000	88,720	19.3	44.6	.....do.....	Muzzle end.
6147	....do ...	....do ...	47,000	87,240	19.7	27.6	Granular, radiating from a serrated spot in the circumference.	Breech end.
6181	....do ...	....do ...	45,000	90,360	20.7	47.2	Silky.....	Do.
6182	....do ...	Outside.	53,000	90,040	22.0	52.2	Fine silky.....	Muzzle end.
6188	....do ...	....do ...	49,000	91,440	22.3	52.2	.....do.....	Breech end.
6194	....do ...	Middle .	47,000	89,480	22.3	44.6	Silky.....	Muzzle end.
6212	....do ...	Outside.	40,000	83,880	24.3	52.2	.....do.....	Do.
6218	....do ...	....do ...	44,000	83,040	23.3	52.2	.....do.....	Breech end.
6230	....do ...	Middle .	48,000	91,400	22.0	44.6	.....do.....	Do.
6246	....do ...	....do ...	45,000	87,240	23.0	47.2	.....do.....	Do.
6254	....do ...	Outside.	59,000	96,080	21.0	49.7	Fine silky.....	Muzzle end.
6259	....do ...	....do ...	40,000	81,640	23.0	54.6	Silky.....	Breech end.
6261	....do ...	Middle .	43,000	87,120	21.0	47.2	.....do.....	Muzzle end.
6295	....do ...	Outside.	51,000	88,720	21.0	47.2	.....do.....	Do.
6300	....do ...	....do ...	43,000	81,640	20.0	47.2	.....do.....	Breech end.
6324	....do ...	Middle .	49,000	89,560	23.3	44.6	.....do.....	Do.
6352	....do ...	....do ...	49,000	92,400	22.0	44.6	.....do.....	Muzzle end.
6366	....do ...	....do ...	46,000	88,120	24.0	49.7	.....do.....	Breech end.
6365	Jacket..	....do ...	47,000	95,640	18.7	30.6	Granular 70 per cent, silky 30 per cent.	Muzzle end.
6078	....do ...	....do ...	49,000	91,280	20.7	41.9	Silky 80 per cent, granular 20 per cent.	Do.
6089	....do ...	....do ...	43,000	89,240	22.3	44.6	Silky.....	Breech end.
6109	....do ...	....do ...	47,000	95,240	19.3	44.6	.....do.....	Do.
6151	....do ...	....do ...	46,000	91,760	20.3	39.2	Granular, radiating from a silky spot at circumference.	Muzzle end.
6154	....do ...	....do ...	46,000	92,560	21.3	44.6	Silky.....	Breech end.
6168	....do ...	....do ...	45,000	87,160	21.0	36.4	Fine granular, silky spot at the circumference.	Do.
6198	....do ...	Outside.	61,000	96,480	18.7	47.2	Silky.....	Do.
6208	....do ...	....do ...	47,000	84,560	24.7	52.2	.....do.....	Muzzle end.
6204	....do ...	Middle .	47,000	94,480	19.0	39.2	Silky, interspersed with granular metal at the circumference.	Breech end.
6210	....do ...	Outside.	44,000	84,720	23.7	49.7	Silky.....	Do.
6213	....do ...	....do ...	59,000	94,840	22.7	47.2	.....do.....	Do.
6229	....do ...	Middle .	47,000	88,560	19.3	47.2	.....do.....	Do.
6255	....do ...	Outside.	55,000	91,520	29.3	49.7	Fine silky.....	Muzzle end.
6256	....do ...	....do ...	53,000	92,400	24.7	49.7	.....do.....	Breech end.
6260	....do ...	Middle .	49,000	96,520	19.3	44.6	Silky.....	Muzzle end.
6296	....do ...	Outside.	56,000	90,400	20.3	49.7	.....do.....	Breech end.
6302	....do ...	....do ...	57,000	94,550	20.7	45.3	.....do.....	Do.
6323	....do ...	Middle .	46,000	91,760	23.3	47.2	Silky, opened crack in surface of stem.	Muzzle end.
6392	....do ...	....do ...	49,000	99,160	18.0	41.9	Silky, trace of granulation.	Breech end.
6404	....do ...	....do ...	47,000	94,840	20.0	36.4	Silky 45 per cent, granular 55 per cent.	Muzzle end.

16-INCH STEEL B. L. RIFLE.

COMPRESSION SPECIMENS FROM TUBE.

No. 1163.

Sample from breech end of tube.
Length, 4″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000267	.000167	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000600	.000167	.....	.....	
12,500	25,000	.000767	.000167	.....	.....	
15,000	30,000	.000933	.000166	.000033	.000033	
20,000	40,000	.001300	.000367	.000067	.000034	
20,500	41,000	.001333	.000033	.....	.....	
21,000	42,000	.001367	.000034	.....	.....	
21,500	43,000	.001400	.000033	.....	.....	
22,000	44,000	.001433	.000033	.....	.....	
22,500	45,000	.001433	0.	.....	.....	
23,000	46,000	.001500	.000067	.....	.....	
23,500	47,000	.001533	.000033	.....	.....	
24,000	48,000	.001567	.000034	.....	.....	
24,500	49,000	.001600	.000033	.....	.....	
25,000	50,000	.001667	.000067	.000100	.000033	
25,500	51,000	.001700	.000033	.....	.....	
26,000	52,000	.001733	.000033	.....	.....	Elastic limit.
26,500	53,000	.003167	.001434	.....	.....	
27,000	54,000	.007633	.004466	.....	.....	
27,500	55,000	.009567	.001934	.....	.....	
43,400	86,800	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 1164.

Sample from muzzle end of tube.
Length, 4″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000067	.000067	0.	.....	
5,000	10,000	.000238	.000166	.....	.....	
7,500	15,000	.000367	.000134	.....	.....	
10,000	20,000	.000500	.000133	.....	.....	
12,500	25,000	.000667	.000167	.....	.....	
15,000	30,000	.000933	.000266	0.	.....	
20,000	40,000	.001167	.000234	0.	.....	
20,500	41,000	.001200	.000033	.....	.....	
21,000	42,000	.001233	.000033	.....	.....	
21,500	43,000	.001267	.000034	.....	.....	
22,000	44,000	.001300	.000033	.....	.....	
22,500	45,000	.001333	.000033	.....	.....	
23,000	46,000	.001367	.000034	.....	.....	
23,500	47,000	.001400	.000033	.....	.....	
24,000	48,000	.001433	.000033	.....	.....	
24,500	49,000	.001467	.000034	.....	.....	
25,000	50,000	.001500	.000033	0.	.....	
25,500	51,000	.001533	.000033	.....	.....	
26,000	52,000	.001567	.000034	.....	.....	
26,500	53,000	.001600	.000033	.....	.....	
27,000	54,000	.001633	.000033	.....	.....	
27,500	55,000	.001667	.000034	.....	.....	
28,000	56,000	.001700	.000033	.....	.....	
28,500	57,000	.001733	.000033	.....	.....	
29,000	58,000	.001767	.000034	.....	.....	Elastic limit.
29,500	59,000	.002800	.001033	.....	.....	
30,000	60,000	.008900	.006100	.....	.....	
47,700	95,400	.....	.....	.....	.....	Tensile strength.

Failed by triple flexure.

RIFLE-BARREL STEEL, .30-CALIBER.

No. 6016.

Marks, A I M.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	0.	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002367	.000367	.....	.....	
14,200	71,000	.002400	.000033	.....	.....	Elastic limit.
14,400	72,000	.003067	.000667	.....	.....	
						Load fell.
13,400	67,000	.003233	.000166	.....	.....	
13,600	68,000	.003600	.000367	.....	.....	
13,800	69,000	.006667	.003067	.....	.....	
14,000	70,000	.009500	.002833	.....	.....	
14,400	72,000	.010767	.001267	.....	.....	
14,800	74,000	.012000	.001233	.....	.....	
15,200	76,000	.013567	.001567	.....	.....	
15,600	78,000	.015000	.001433	.....	.....	
16,000	80,000	.016667	.001667	.....	.....	
16,800	84,000	.020000	.003333	.....	.....	
17,600	88,000	.023167	.003167	.....	.....	
18,400	92,000	.027433	.004266	.....	.....	
19,200	96,000	.032033	.004600	.....	.....	
20,000	100,000	.037000	.004967	.....	.....	
20,800	104,000	.0433	.0063	.....	.....	
21,600	108,000	.0533	.0100	.....	.....	
22,400	112,000	.0667	.0134	.....	.....	
23,200	116,000	.0900	.0233	.....	.....	
23,620	118,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	118,100
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.1733
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1″.5 from neck
Character of broken surface		silky, interspersed with fine granulation, cup shaped
Elongation of inch sections		″.11, ″.29*, ″.12

No. 6017.

Marks, A I M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
200	1,000	0.	0.	0.	0.	
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	.....	.....	
12,000	60,000	.002033	.000333	0.	.....	
14,000	70,000	.002400	.000367	.....	.....	
14,200	71,000	.002467	.000067	.....	.....	
14,400	72,000	.002533	.000066	.....	.....	
14,600	73,000	.002600	.000067	.....	.....	
14,800	74,000	.002633	.000033	.....	.....	
15,000	75,000	.002688	0.	.....	.....	Elastic limit. Load fell.
13,600	68,000	.004000	.001367	.....	.....	
13,800	69,000	.004333	.000333	.....	.....	
14,000	70,000	.007167	.002834	.....	.....	
14,400	72,000	.011733	.004566	.....	.....	
14,800	74,000	.012533	.000800	.....	.....	
15,200	76,000	.013667	.001134	.....	.....	
15,600	78,000	.015067	.001400	.....	.....	
16,000	80,000	.016767	.001700	.....	.....	
16,800	84,000	.020633	.003866	.....	.....	
17,600	88,000	.023433	.002800	.....	.....	
18,400	92,000	.027700	.004267	.....	.....	
19,200	96,000	.032000	.004300	.....	.....	
20,000	100,000	.036667	.004667	.....	.....	
20,800	104,000	.0433	.006633	.....	.....	
21,600	108,000	.0533	.0100	.....	.....	
22,400	112,000	.0633	.0100	.....	.....	
23,200	116,000	.0900	.0267	.....	.....	
23,480	117,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	117,400
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002633
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		at middle of stem
Character of broken surface		silky, interspersed with fine granulation, cup shaped
Elongation of inch sections		".12, ".31*, ".14

No. 6018.

Marks, A I M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000667	.000867	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001700	.000333	.....	.....	
12,000	60,000	.002067	.000367	0.	.....	
14,000	70,000	.002400	.000333	.....	.....	
14,200	71,000	.002433	.000033	.....	.....	
14,400	72,000	.002467	.000034	.....	.....	Elastic limit. Load fell.
13,200	66,000	.008367	.000900	.....	.....	
13,400	67,000	.004000	.000633	.....	.....	
13,600	68,000	.007000	.008000	.....	.....	
13,800	69,000	.009733	.002733	.....	.....	
14,000	70,000	.010300	.000567	.....	.....	
14,400	72,000	.012300	.002000	.....	.....	
14,800	74,000	.013667	.001367	.....	.....	
15,200	76,000	.015100	.001433	.....	.....	
15,600	78,000	.016667	.001567	.....	.....	
16,000	80,000	.018333	.001666	.....	.....	
16,800	84,000	.021433	.003100	.....	.....	
17,600	88,000	.024967	.003534	.....	.....	
18,400	92,000	.029367	.004400	.....	.....	
19,200	96,000	.034000	.004633	.....	.....	
20,000	100,000	.039333	.005333	.....	.....	
20,800	104,000	.0467	.007367	.....	.....	
21,600	108,000	.0567	.0100	.....	.....	
22,400	112,000	.0700	.0133	.....	.....	
23,140	115,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	115,700
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.1883
Elongation per inch under strain at elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		$\frac{1}{2}$.12, $\frac{1}{2}$.32*, $\frac{1}{2}$.11

No. 6019.

Marks, A I E.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	0.	.....	
14,000	70,000	.002433	.000400	.....	.....	
15,000	75,000	.002633	.000200	.....	.....	
15,200	76,000	.002667	.000034	.....	.....	
15,400	77,000	.002700	.000033	.....	.....	Elastic limit.
15,600	78,000	.003600	.000900	.....	.....	
						Load fell.
14,000	70,000	.003900	.000300	.....	.....	
14,200	71,000	.004333	.000433	.....	.....	
14,400	72,000	.007000	.002667	.....	.....	
14,600	73,000	.010667	.003667	.....	.....	
14,800	74,000	.012433	.001766	.....	.....	
15,200	76,000	.013167	.000734	.....	.....	
15,600	78,000	.014333	.001166	.....	.....	
16,000	80,000	.016000	.001667	.....	.....	
16,400	82,000	.017600	.001600	.....	.....	
16,800	84,000	.019367	.001767	.....	.....	
17,600	88,000	.023000	.003633	.....	.....	
18,400	92,000	.026567	.003567	.....	.....	
19,200	96,000	.031100	.004533	.....	.....	
20,000	100,000	.036667	.005567	.....	.....	
20,800	104,000	.0433	.006633	.....	.....	
21,600	108,000	.0533	.0100	.....	.....	
22,400	112,000	.0600	.0067	.....	.....	
23,200	116,000	.0767	.0167	.....	.....	
23,760	118,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	118,800
Elastic limit per square inch of original section	do...	77,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.002700
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1" from neck
Character of broken surface		silky, interspersed with fine granulation cup shaped
Elongation of inch sections		".25*, ".18, ".10

No. 6020.

Marks, A I E.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	0.	.....	
14,000	70,000	.002400	.000367	.....	.....	
14,200	71,000	.002433	.000033	.....	.....	
14,400	72,000	.002467	.000034	.....	.....	Elastic limit.
						Load fell.
13,600	68,000	.008633	.001166	.....	.....	
13,800	69,000	.005167	.001534	.....	.....	
14,000	70,000	.009600	.004433	.....	.....	
14,200	71,000	.010033	.000433	.....	.....	
14,400	72,000	.010667	.000634	.....	.....	
14,800	74,000	.012033	.001366	.....	.....	
15,200	76,000	.013433	.001400	.....	.....	
15,600	78,000	.015000	.001567	.....	.....	
16,000	80,000	.016500	.001500	.....	.....	
16,800	84,000	.019667	.003167	.....	.....	
17,600	88,000	.023267	.003600	.....	.....	
18,400	92,000	.026667	.003400	.....	.....	
19,200	96,000	.031667	.005000	.....	.....	
20,000	100,000	.035833	.004166	.....	.....	
20,800	104,000	.0433	.007467	.....	.....	
21,600	108,000	.0500	.0067	.....	.....	
22,400	112,000	.0567	.0067	.....	.....	
23,200	116,000	.0833	.0266	.....	.....	
23,580	117,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	117,900
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1".6 from neck
Character of broken surface		silky, interspersed with fine granulation, cup shaped
Elongation of inch sections		".12, ".28*, ".13

No. 6021.

Marks, A. I. E.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	.....	.....	
14,000	70,000	.002400	.000367	.....	.....	
14,200	71,000	.002467	.000067	.....	.....	Elastic limit.
14,400	72,000	.002567	.000100	.....	.....	
		.003333	.000766	.....	.....	Load fell.
13,000	65,000	.008467	.000134	.....	.....	
13,200	66,000	.008733	.000266	.....	.....	
13,400	67,000	.006667	.002934	.....	.....	
13,600	68,000	.010400	.003733	.....	.....	
13,800	69,000	.011033	.000633	.....	.....	
14,000	70,000	.011633	.000600	.....	.....	
14,400	72,000	.013067	.001434	.....	.....	
14,800	74,000	.015000	.001933	.....	.....	
15,200	76,000	.016333	.001333	.....	.....	
15,600	78,000	.017833	.001500	.....	.....	
16,000	80,000	.019667	.001834	.....	.....	
16,800	84,000	.023333	.003666	.....	.....	
17,600	88,000	.027700	.004367	.....	.....	
18,400	92,000	.031767	.004067	.....	.....	
19,200	96,000	.037167	.005400	.....	.....	
20,000	100,000	.043667	.006500	.....	.....	
20,800	104,000	.0533	.009633	.....	.....	
21,600	108,000	.0667	.0134	.....	.....	
22,400	112,000	.0900	.0233	.....	.....	
22,610	113,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	113,050
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		at middle of stem
Character of broken surface		fine, silky, cup shaped
Elongation of inch sections		a.14, a.84*, b.12

No. 6068.

Marks, A.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001033	.000366	.....	.....	
8,000	40,000	.001367	.000334	0.	.....	
10,000	50,000	.001733	.000366	.....	.....	
12,000	60,000	.002167	.000434	.....	.....	
13,200	66,000	.002400	.000233	.....	.....	
13,400	67,000	.002467	.000067	.....	.....	Elastic limit.
13,600	68,000	.010333	.007866	.....	.....	
13,800	69,000	.014667	.004334	.....	.....	
14,000	70,000	.019500	.004833	.....	.....	
14,200	71,000	.021233	.001733	.....	.....	
14,400	72,000	.022167	.000934	.....	.....	
14,800	74,000	.023833	.001666	.....	.....	
15,200	76,000	.026000	.002167	.....	.....	
15,600	78,000	.028433	.002433	.....	.....	
16,000	80,000	.031000	.002567	.....	.....	
16,800	84,000	.036667	.005667	.....	.....	
17,600	88,000	.042833	.006166	.....	.....	
18,400	92,000	.0533	.010467	.....	.....	
19,200	96,000	.0667	.0134	.....	.....	
20,000	100,000	.0867	.0200	.....	.....	
20,780	103,900	.1600	.0733	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,900
Elastic limit per square inch of original section	do...	67,000
Elongation per inch after rupture	inch..	.2233
Elongation per inch under strain at elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1".25 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".25", ".29", ".13

No. 6069.

Marks, A.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	0.	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	.....	.....	
13,000	65,000	.002267	.000234	.....	.....	
13,200	66,000	.002300	.000033	.....	.....	
13,400	67,000	.002333	.000033	.....	.....	
13,600	68,000	.002333	0.	.....	.....	
13,800	69,000	.002367	.000034	.....	.....	Elastic limit.
14,000	70,000	.002467	.000100	.....	.....	
						Load fell.
13,600	68,000	.008400	.000933	.....	.....	
13,800	69,000	.004000	.000600	.....	.....	
14,000	70,000	.005333	.001333	.....	.....	
14,200	71,000	.006167	.000834	.....	.....	
14,400	72,000	.008333	.002166	.....	.....	
14,800	74,000	.010333	.002000	.....	.....	
15,200	76,000	.014167	.003834	.....	.....	
15,600	78,000	.017333	.003166	.....	.....	
16,000	80,000	.019333	.002000	.....	.....	
16,800	84,000	.023167	.003834	.....	.....	
17,600	88,000	.027333	.004166	.....	.....	
18,400	92,000	.0333	.005967	.....	.....	
19,200	96,000	.0367	.003400	.....	.....	
20,000	100,000	.0433	.0066	.....	.....	
20,800	104,000	.0533	.0100	.....	.....	
21,600	108,000	.0633	.0100	.....	.....	
22,400	112,000	.0833	.0200	.....	.....	
22,810	114,050	.1100	.0267	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	114,050
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.002367
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		".9 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".30*, ".13, ".10

No. 6070.

Marks, A.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001700	.000333	0.	.....	
12,000	60,000	.002033	.000333	.....	.....	
13,000	65,000	.002267	.000234	.....	.....	
13,200	66,000	.002300	.000033	.....	.....	
13,400	67,000	.002333	.000033	.....	.....	
13,600	68,000	.002367	.000034	.....	.....	
13,800	69,000	.002400	.000033	.....	.....	
14,000	70,000	.002433	.000033	.....	.....	Elastic limit.
						Load fell.
13,000	65,000	.003300	.000867	.....	.....	
13,200	66,000	.006333	.003033	.....	.....	
13,400	67,000	.016500	.000167	.....	.....	
13,600	68,000	.017267	.000767	.....	.....	
13,800	69,000	.017500	.000233	.....	.....	
14,000	70,000	.017933	.000433	.....	.....	
14,200	71,000	.018400	.000467	.....	.....	
14,400	72,000	.019333	.000933	.....	.....	
14,800	74,000	.021000	.001667	.....	.....	
15,200	76,000	.023000	.002000	.....	.....	
15,600	78,000	.025000	.002000	.....	.....	
16,000	80,000	.027167	.002167	.....	.....	
16,800	84,000	.031667	.004500	.....	.....	
17,600	88,000	.037333	.005666	.....	.....	
18,400	92,000	.0467	.009367	.....	.....	
19,200	96,000	.0533	.0066	.....	.....	
20,000	100,000	.0667	.0134	.....	.....	
20,800	104,000	.0867	.0200	.....	.....	
21,390	106,950	.1433	.0566	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	106,950
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".6 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".12, ".84*, ".14

MADE FROM BAR.

No. 6096.

Marks, 78.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001033	.000366	.....	.....	
8,000	40,000	.001367	.000334	.....	.....	
10,000	50,000	.001733	.000366	0.	.....	
12,000	60,000	.002067	.000334	.....	.....	
13,000	65,000	.002267	.000200	.....	.....	
13,200	66,000	.002300	.000033	.....	.....	
13,400	67,000	.002333	.000033	.....	.....	
13,600	68,000	.002367	.000034	.....	.....	
13,800	69,000	.002400	.000033	.....	.....	
14,000	70,000	.002433	.000033	.....	.....	
14,200	71,000	.002467	.000034	.....	.....	
14,400	72,000	.002500	.000033	.....	.....	
14,600	73,000	.002567	.000067	.....	.....	
14,800	74,000	.002600	.000033	.....	.....	
15,000	75,000	.002633	.000033	.....	.....	Elastic limit.
15,200	76,000	.011233	.008600	.....	.....	
15,400	77,000	.011400	.000167	.....	.....	
15,600	78,000	.011900	.000500	.....	.....	
16,800	79,000	.012333	.000433	.....	.....	
16,000	80,000	.013033	.000700	.....	.....	
16,400	82,000	.014300	.001267	.....	.....	
16,800	84,000	.015833	.001533	.....	.....	
17,600	88,000	.019067	.003234	.....	.....	
18,400	92,000	.022833	.003766	.....	.....	
19,200	96,000	.026600	.003767	.....	.....	
20,000	100,000	.030267	.003667	.....	.....	
20,800	104,000	.034667	.004400	.....	.....	
21,600	108,000	.040333	.005666	.....	.....	
22,400	112,000	.0500	.009667	.....	.....	
23,200	116,000	.0600	.0100	.....	.....	
24,000	120,000	.0767	.0167	.....	.....	
24,610	123,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	123,050
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.002633
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		".9 from neck
Character of broken surface		fine granular, radiating from the center
Elongation of inch sections		".10, ".13, "22*

From Butt of Barrels, Heated in New Furnace and Rolled.

No. 6097.

Marks, 78.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	0.	.....	
10,000	50,000	.001733	.000366	.....	.....	
12,000	60,000	.002100	.000367	.....	.....	
12,200	61,000	.002167	.000067	.....	.....	
12,400	62,000	.002233	.000066	.....	.....	
12,600	63,000	.002267	.000034	.....	.....	
12,800	64,000	.002333	.000066	.....	.....	Elastic limit.
13,000	65,000	.006500	.006167	.....	.....	
13,200	66,000	.009000	.000500	.....	.....	
13,400	67,000	.009700	.000700	.....	.....	
13,600	68,000	.010067	.000367	.....	.....	
13,800	69,000	.010667	.000600	.....	.....	
14,000	70,000	.011333	.000666	.....	.....	
14,400	72,000	.012700	.001367	.....	.....	
14,800	74,000	.014000	.001300	.....	.....	
15,200	76,000	.015667	.001667	.....	.....	
15,600	78,000	.017000	.001333	.....	.....	
16,000	80,000	.018700	.001700	.....	.....	
16,800	84,000	.022000	.003300	.....	.....	
17,600	88,000	.025400	.003400	.....	.....	
18,400	92,000	.028967	.003567	.....	.....	
19,200	96,000	.033700	.004733	.....	.....	
20,000	100,000	.039000	.005300	.....	.....	
20,800	104,000	.0467	.0077	.....	.....	
21,600	108,000	.0567	.0100	.....	.....	
22,400	112,000	.0667	.0100	.....	.....	
23,200	116,000	.1167	.0500	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	116,000
Elastic limit per square inch of original section	do...	64,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		".75 from neck
Character of broken surface		silky, interspersed with fine granulation, radiating from the center
Elongation of inch sections		".23*, ".11, ".08

No. 6098.

Marks, 78 .
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000300	.000167	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002033	.000333	.....	.....	
12,200	61,000	.002100	.000067	.....	.....	
12,400	62,000	.002167	.000067	.....	.....	
12,600	63,000	.002233	.000066	.....	.....	
12,800	64,000	.002267	.000034	.....	.....	
13,000	65,000	.002333	.000066	.....	.....	
13,200	66,000	.002333	0.	.....	.....	Elastic limit.
13,400	67,000	.009667	.007334	.....	.....	
13,600	68,000	.010600	.000933	.....	.....	
13,800	69,000	.011200	.000600	.....	.....	
14,000	70,000	.011667	.000467	.....	.....	
14,400	72,000	.012833	.001166	.....	.....	
14,800	74,000	.014167	.001334	.....	.....	
15,200	76,000	.016500	.002333	.....	.....	
15,600	78,000	.017467	.000967	.....	.....	
16,000	80,000	.018833	.001366	.....	.....	
16,800	84,000	.022733	.003900	.....	.....	
17,600	88,000	.026667	.003934	.....	.....	
18,400	92,000	.030667	.004000	.....	.....	
19,200	96,000	.035667	.005000	.....	.....	
20,000	100,000	.041333	.005666	.....	.....	
20,800	104,000	.0500	.008667	.....	.....	
21,600	108,000	.0633	.0133	.....	.....	
22,400	112,000	.0833	.0200	.....	.....	
22,820	114,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	114,100
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	.1333
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		″.8 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		″.21*, ″.12, ″.07

No. 6099.

Marks, B ✠ R.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000200	.....	.....	
6,000	30,000	.000983	.000333	.....	.....	
8,000	40,000	.001300	.000367	.....	.....	
10,000	50,000	.001633	.000333	0.	.....	
12,000	60,000	.001967	.000334	.....	.....	
14,000	70,000	.002300	.000333	.....	.....	
16,000	80,000	.002633	.000333	.....	.....	
18,000	90,000	.003000	.000367	.....	.....	
20,000	100,000	.003333	.000333	.....	.....	
20,200	101,000	.003367	.000034	.....	.....	Elastic limit.
20,400	102,000	.025100	.021733	.....	.....	
20,600	103,000	.026067	.000967	.....	.....	
20,800	104,000	.026933	.000866	.....	.....	
21,200	106,000	.029333	.002400	.....	.....	
21,600	108,000	.031833	.002500	.....	.....	
22,000	110,000	.034500	.002667	.....	.....	
22,400	112,000	.037333	.002833	.....	.....	
23,200	116,000	.0467	.009367	.....	.....	
24,000	120,000	.0600	.0133	.....	.....	
24,800	124,000	.0833	.0233	.....	.....	
25,110	125,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	125,550
Elastic limit per square inch of original section	do...	101,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.003367
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		1″.21 from neck
Character of broken surface		fine silky, cup-shaped, serrated surface
Elongation of inch sections		″.09, ″.19*, ″.21*

No. 6100.

Marks, B ✠ R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002333	.000333	.....	.....	
16,000	80,000	.002667	.000334	.....	.....	
18,000	90,000	.003000	.000333	.....	.....	
20,000	100,000	.003333	.000333	.....	.....	
20,200	101,000	.003367	.000034	.....	.....	
20,400	102,000	.003400	.000033	.....	.....	
20,600	103,000	.003433	.000033	.....	.....	Elastic limit.
20,800	104,000	.004500	.001067	.....	.....	
						Load fell.
19,200	96,000	.005083	.000583	.....	.....	
19,400	97,000	.010700	.005667	.....	.....	
19,600	98,000	.013667	.002967	.....	.....	
19,800	99,000	.020000	.006333	.....	.....	
20,000	100,000	.020600	.000600	.....	.....	
20,200	101,000	.021100	.000500	.....	.....	
20,400	102,000	.021600	.000500	.....	.....	
20,600	103,000	.022667	.001067	.....	.....	
20,800	104,000	.023333	.000666	.....	.....	
21,200	106,000	.025667	.002334	.....	.....	
21,600	108,000	.027667	.002000	.....	.....	
22,000	110,000	.030000	.002333	.....	.....	
22,400	112,000	.034000	.004000	.....	.....	
23,200	116,000	.040000	.006000	.....	.....	
24,000	120,000	.0500	.0100	.....	.....	
24,800	124,000	.0633	.0133	.....	.....	
25,460	127,300	.1033	.0400	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	127,300
Elastic limit per square inch of original section	do...	103,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.003433
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		".95 from neck
Character of broken surface		fine silky, cup-shaped
Elongation of inch sections		".07, ".11, ".27*

No. 6101.

Marks, B ✠ R.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002333	.000333	.....	.....	
16,000	80,000	.002667	.000334	.....	.....	
18,000	90,000	.003000	.000333	.....	.....	
20,000	100,000	.003367	.000367	.....	.....	
20,200	101,000	.003400	.000033	.....	.....	
20,400	102,000	.003433	.000033	.....	.....	
20,600	103,000	.003467	.000034	.....	.....	Elastic limit.
						Load fell.
19,200	96,000	.004533	.001066	.....	.....	
19,400	97,000	.005333	.000800	.....	.....	
19,600	98,000	.010667	.005334	.....	.....	
19,800	99,000	.012667	.002000	.....	.....	
20,000	100,000	.023467	.010800	.....	.....	
20,200	101,000	.024167	.000700	.....	.....	
20,400	102,000	.024500	.000333	.....	.....	
20,800	104,000	.025267	.000767	.....	.....	
21,200	106,000	.027000	.001733	.....	.....	
21,600	108,000	.029633	.002633	.....	.....	
22,400	112,000	.036600	.006967	.....	.....	
23,200	116,000	.042667	.006067	.....	.....	
24,000	120,000	.052333	.009666	.....	.....	
24,800	124,000	.0700	.017667	.....	.....	
25,270	126,350	.1033	.0333	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	126,350
Elastic limit per square inch of original section	do...	103,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.003467
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section	.....	87.1
Position of rupture	.....	″.8 from neck
Character of broken surface	.....	fine silky, cup shaped
Elongation of inch sections	.....	″.09, ″.10, ″.26*

No. 6102.

Marks, B ✠ W.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001633	.000333	.....	.....	
12,000	60,000	.001967	.000334	.....	.....	
14,000	70,000	.002300	.000333	.....	.....	
16,000	80,000	.002633	.000333	.....	.....	
17,200	86,000	.002800	.000167	.....	.....	
17,400	87,000	.002833	.000033	.....	.....	Elastic limit. Load fell.
16,400	82,000	.004333	.001500	.....	.....	
16,600	83,000	.014167	.009834	.....	.....	
16,800	84,000	.019000	.004833	.....	.....	
17,000	85,000	.020000	.001000	.....	.....	
17,200	86,000	.020567	.000567	.....	.....	
17,600	88,000	.021833	.001266	.....	.....	
18,000	90,000	.025333	.003500	.....	.....	
19,200	96,000	.032500	.007167	.....	.....	
20,000	100,000	.042667	.010167	.....	.....	
20,800	104,000	.052667	.010000	.....	.....	
21,600	108,000	.0767	.024033	.....	.....	
22,210	111,050	.1200	.0433	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	111,050
Elastic limit per square inch of original section	do...	87,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002833
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.07 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.29*, ″.16, ″.11

No. 6103.

Marks, B ✠ W.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000667	.000867	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001700	.000333	0.	.....	
12,000	60,000	.002000	.000300	.....	.....	
14,000	70,000	.002333	.000333	.....	.....	
16,000	80,000	.002700	.000367	.....	.....	
17,000	85,000	.002867	.000167	.....	.....	
17,200	86,000	.002900	.000033	.....	.....	
17,400	87,000	.002933	.000033	.....	.....	Elastic limit.
						Load fell.
16,200	81,000	.004267	.001334	.....	.....	
16,400	82,000	.010000	.005733	.....	.....	
16,600	83,000	.016000	.006000	.....	.....	
16,800	84,000	.016667	.000667	.....	.....	
17,000	85,000	.017267	.000600	.....	.....	
17,200	86,000	.018000	.000733	.....	.....	
17,600	88,000	.020000	.002000	.....	.....	
18,000	90,000	.022500	.002500	.....	.....	
18,400	92,000	.024667	.002167	.....	.....	
19,200	96,000	.031400	.006733	.....	.....	
20,000	100,000	.038833	.007433	.....	.....	
20,800	104,000	.045000	.006167	.....	.....	
21,600	108,000	.0533	.0133	.....	.....	
22,400	112,000	.0933	.0300	.....	.....	
22,510	112,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,550
Elastic limit per square inch of original section	do...	87,000
Elongation per inch after rupture	inch..	.1733
Elongation per inch under strain at elastic limit	do...	.002933
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1″.4 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.10, ″.29*, ″.13

No. 6104.

Marks, B ✠ W.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3"

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002367	.000367	.....	.....	
16,000	80,000	.002700	.000333	.....	.....	
17,000	85,000	.002900	.000200	.....	.....	Elastic limit. Load fell.
16,400	82,000	.004333	.001433	.....	.....	
16,600	83,000	.005500	.001167	.....	.....	
16,800	84,000	.012333	.006833	.....	.....	
17,200	86,000	.020667	.008234	.....	.....	
17,600	88,000	.021767	.001100	.....	.....	
18,000	90,000	.023000	.001233	.....	.....	
18,400	92,000	.026333	.003333	.....	.....	
19,200	96,000	.033167	.006834	.....	.....	
20,000	100,000	.040000	.006833	.....	.....	
20,800	104,000	.048000	.008000	.....	.....	
21,600	108,000	.0667	.0187	.....	.....	
22,400	112,000	.1000	.0333	.....	.....	
22,510	112,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	112,550
Elastic limit, per square inch of original section	do...	85,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.002900
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		1".20 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".11, ".22*, ".20*

END OF BAR BEFORE ROLLING.

No. 6123.

Marks, 79 E.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000833	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001033	.000366	.....	.....	
8,000	40,000	.001367	.000334	.....	.....	
10,000	50,000	.001733	.000366	0.	.....	
12,000	60,000	.002067	.000334	.....	.....	
13,800	69,000	.002400	.000333	.....	.....	Elastic limit.
						Load fell.
13,000	65,000	.008667	.001267	.....	.....	
13,200	66,000	.005333	.001666	.....	.....	
13,400	67,000	.008500	.003167	.....	.....	
13,600	68,000	.009300	.000800	.....	.....	
14,000	70,000	.010100	.000800	.....	.....	
14,400	72,000	.011433	.001333	.....	.....	
15,200	76,000	.014000	.002567	.....	.....	
16,000	80,000	.017500	.003500	.....	.....	
16,800	84,000	.021000	.003500	.....	.....	
17,600	88,000	.024000	.003000	.....	.....	
18,400	92,000	.028500	.004500	.....	.....	
19,200	96,000	.033000	.004500	.....	.....	
20,000	100,000	.038833	.005833	.....	.....	
20,800	104,000	.044333	.005500	.....	.....	
21,600	108,000	.0567	.012367	.....	.....	
22,400	112,000	.0700	.0133	.....	.....	
23,060	115,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	115,800
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		at middle of stem
Character of broken surface		fine, silky
Elongation of inch sections		".18, ".35, ".12

End of Bar after Rolling.

No. 6124.

Marks, 79 E B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000700	.000367	.....	.....	
6,000	30,000	.001033	.000333	.....	.....	
8,000	40,000	.001400	.000367	.....	.....	
10,000	50,000	.001767	.000367	0.	.....	
10,800	54,000	.001900	.000133	.....	.....	Elastic limit.
						Load fell.
10,200	51,000	.003600	.001700	.....	.....	
10,400	52,000	.004333	.000733	.....	.....	
10,600	53,000	.005167	.000834	.....	.....	
10,800	54,000	.007933	.002766	.....	.....	
11,200	56,000	.009000	.001067	.....	.....	
11,600	58,000	.010333	.001333	.....	.....	
12,000	60,000	.011500	.001167	.....	.....	
12,800	64,000	.014933	.003433	.....	.....	
13,600	68,000	.017500	.002567	.....	.....	
14,400	72,000	.020333	.002833	.....	.....	
15,200	76,000	.024000	.003667	.....	.....	
16,000	80,000	.028333	.004333	.....	.....	
16,800	84,000	.032500	.004167	.....	.....	
17,600	88,000	.038333	.005833	.....	.....	
18,400	92,000	.045333	.007000	.....	.....	
19,200	96,000	.054667	.009334	.....	.....	
20,000	100,000	.069333	.014666	.....	.....	
20,800	104,000	.1133	.043967	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,000
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1833
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1.″19 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.12, ″.24*, ″.19*

MIDDLE OF BAR BEFORE ROLLING.

No. 6125.

Marks, 79 M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000700	.000367	.....	.....	
6,000	30,000	.001033	.000333	.....	.....	
8,000	40,000	.001367	.000334	.....	.....	
10,000	50,000	.001733	.000366	0.	.....	
12,000	60,000	.002100	.000367	.....	.....	
13,600	68,000	.002400	.000300	.....	.....	Elastic limit.
						Load fell.
12,600	63,000	.003433	.001033	.....	.....	
12,800	64,000	.003900	.000467	.....	.....	
13,000	65,000	.005333	.001433	.....	.....	
13,200	66,000	.006267	.002434	.....	.....	
13,600	68,000	.009333	.001066	.....	.....	
14,000	70,000	.010567	.001234	.....	.....	
14,400	72,000	.012000	.001433	.....	.....	
15,200	76,000	.014667	.002667	.....	.....	
16,000	80,000	.018000	.003333	.....	.....	
16,800	84,000	.021000	.003000	.....	.....	
17,600	88,000	.024600	.003600	.....	.....	
18,400	92,000	.028333	.003733	.....	.....	
19,200	96,000	.033000	.004667	.....	.....	
20,000	100,000	.038000	.005000	.....	.....	
20,800	104,000	.045000	.007000	.....	.....	
21,600	108,000	.054333	.009333	.....	.....	
22,400	112,000	.0767	.022367	.....	.....	
23,010	115,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	115,050
Elastic limit per square inch of original section	do...	68,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1".4 from neck
Character of broken surface		fine silky
Elongation of inch sections		".16, ".30*, ".11

Middle of Bar after Rolling.

No. 6126.

Marks, 79 M B.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001033	.000366	.....	.....	
8,000	40,000	.001367	.000334	.....	.....	
10,000	50,000	.001700	.000333	.000033	.000033	
11,000	55,000	.001900	.000200	.....	.....	Elastic limit.
11,200	56,000	.002667	.000767	.....	.....	
						Load fell.
10,400	52,000	.003267	.000600	.....	.....	
10,600	53,000	.003667	.000400	.....	.....	
10,800	54,000	.005733	.002066	.....	.....	
11,000	55,000	.006600	.000867	.....	.....	
11,200	56,000	.009000	.002400	.....	.....	
11,600	58,000	.010333	.001333	.....	.....	
12,000	60,000	.011067	.000734	.....	.....	
12,800	64,000	.013967	.002900	.....	.....	
13,600	68,000	.017333	.003366	.....	.....	
14,400	72,000	.020000	.002667	.....	.....	
15,200	76,000	.024000	.004000	.....	.....	
16,000	80,000	.028000	.004000	.....	.....	
16,800	84,000	.032833	.004833	.....	.....	
17,600	88,000	.038167	.005334	.....	.....	
18,400	92,000	.044667	.006500	.....	.....	
19,200	96,000	.053333	.008666	.....	.....	
20,000	100,000	.069000	.015667	.....	.....	
21,020	105,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,100
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1800
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.10, ″.31[a], ″.13

No. 6155.

Marks, A. E. 1.
Diameter, ".505."
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	.000033	.000033	
12,000	60,000	.002000	.000300	.....	.....	
13,000	65,000	.002200	.000200	.....	.....	
14,000	70,000	.002367	.000167	.....	.....	
15,000	75,000	.002600	.000233	.....	.....	Elastic limit.
15,200	76,000	.002733	.000133	.....	.....	
15,400	77,000	.010633	.007900	.....	.....	
15,600	78,000	.011033	.000400	.....	.....	
15,800	79,000	.011367	.000334	.....	.....	
16,000	80,000	.012000	.000633	.....	.....	
16,400	82,000	.013600	.001600	.....	.....	
16,800	84,000	.015033	.001433	.....	.....	
17,200	86,000	.016167	.001134	.....	.....	
17,600	88,000	.017767	.001600	.....	.....	
18,400	92,000	.021667	.003900	.....	.....	
19,200	96,000	.024700	.003033	.....	.....	
20,000	100,000	.029100	.004400	.....	.....	
20,800	104,000	.033000	.003900	.....	.....	
21,600	108,000	.037833	.004833	.....	.....	
22,400	112,000	.043667	.005834	.....	.....	
23,200	116,000	.051167	.007500	.....	.....	
24,000	120,000	.061667	.010500	.....	.....	
24,800	124,000	.0900	.028333	.....	.....	
25,110	125,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	125,550
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.002600
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		at middle of stem
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		".11, ".24*, ".12

No. 6156.

Marks, A–E–2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	0.	.....	
14,000	70,000	.002367	.000334	.....	.....	
15,000	75,000	.002600	.000233	.....	.....	
15,200	76,000	.002633	.000033	.....	.....	
15,400	77,000	.002667	.000034	.....	.....	Elastic limit.
		.013933	.011266	.....	.....	
15,600	78,000	.014400	.000467	.....	.....	
16,000	80,000	.016333	.001933	.....	.....	
16,800	84,000	.019167	.002834	.....	.....	
17,600	88,000	.023400	.004233	.....	.....	
18,400	92,000	.028333	.004933	.....	.....	
19,200	96,000	.031600	.003267	.....	.....	
20,000	100,000	.036667	.005067	.....	.....	
20,800	104,000	.042500	.005833	.....	.....	
21,600	108,000	.050000	.007500	.....	.....	
22,400	112,000	.061000	.011000	.....	.....	
23,200	116,000	.0833	.0223	.....	.....	
23,700	118,500	.1333	.0500	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	118,500
Elastic limit per square inch of original section	do...	77,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.002667
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".13, ".34*, ".14

No. 6157.

Marks, A–M–1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000833	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	0.	.....	
14,000	70,000	.002367	.000334	.....	.....	
15,200	76,000	.002633	.000266	.....	.....	Elastic limit.
15,400	77,000	.014500	.011867	.....	.....	
15,600	78,000	.015333	.000833	.....	.....	
15,800	79,000	.016000	.000667	.....	.....	
16,000	80,000	.017000	.001000	.....	.....	
16,400	82,000	.018333	.001333	.....	.....	
16,800	84,000	.020267	.001934	.....	.....	
17,600	88,000	.024600	.004333	.....	.....	
18,400	92,000	.028333	.003733	.....	.....	
19,200	96,000	.032667	.004334	.....	.....	
20,000	100,000	.037500	.004833	.....	.....	
20,800	104,000	.044000	.006500	.....	.....	
21,600	108,000	.053000	.009000	.....	.....	
22,400	112,000	.064833	.011833	.....	.....	
23,200	116,000	.0900	.025167	.....	.....	
23,420	117,100	.1300	.0400	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	117,100
Elastic limit per square inch of original section	do...	76,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.002633
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1."5 from neck
Character of broken surface		fine silky
Elongation of inch sections		".14, ".32*, ".12

No. 6158.

Marks, A–M–2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	.....	.....	
12,000	60,000	.002033	.000333	0.	.....	
14,000	70,000	.002400	.000367	.....	.....	
15,000	75,000	.002667	.000267	.....	.....	Elastic limit.
15,200	76,000	.009667	.007000	.....	.....	
15,400	77,000	.010667	.001000	.....	.....	
15,600	78,000	.011167	.000500	.....	.....	
15,800	79,000	.011467	.000300	.....	.....	
16,000	80,000	.012333	.000866	.....	.....	
16,400	82,000	.013500	.001167	.....	.....	
16,800	84,000	.015100	.001600	.....	.....	
17,600	88,000	.018333	.003233	.....	.....	
18,400	92,000	.021467	.003134	.....	.....	
19,200	96,000	.025000	.003533	.....	.....	
20,000	100,000	.028500	.003500	.....	.....	
20,800	104,000	.032833	.004333	.....	.....	
21,600	108,000	.038000	.005167	.....	.....	
22,400	112,000	.044000	.006000	.....	.....	
23,200	116,000	.052500	.008500	.....	.....	
24,000	120,000	.064000	.011500	.....	.....	
24,800	124,000	.0967	.0327	.....	.....	
24,910	124,550	.1067	.0100	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	124,550
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.002667
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		1.″8 from neck
Character of broken surface		fine granular, radiating from the center
Elongation of inch sections		″.14, ″.17, ″.11

No. 6159.

Marks, A R 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002000	.000333	0.	.....	
14,000	70,000	.002333	.000333	.....	.....	
14,200	71,000	.002400	.000067	.....	.....	
14,400	72,000	.002433	.000033	.....	.....	Elastic limit.
14,600	73,000	.018667	.016234	.....	.....	
14,800	74,000	.019000	.000333	.....	.....	
15,000	75,000	.019267	.000267	.....	.....	
15,200	76,000	.019500	.000233	.....	.....	
15,600	78,000	.021067	.001567	.....	.....	
16,000	80,000	.022667	.001600	.....	.....	
16,400	82,000	.025000	.002333	.....	.....	
16,800	84,000	.026667	.001667	.....	.....	
17,600	88,000	.031667	.005000	.....	.....	
18,400	92,000	.036667	.005000	.....	.....	
19,200	96,000	.042500	.005833	.....	.....	
20,000	100,000	.050333	.007833	.....	.....	
20,800	104,000	.059333	.009000	.....	.....	
21,600	108,000	.076667	.017334	.....	.....	
22,400	112,000	.1200 .1483	.043333 .0233	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,000
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".6 from neck
Character of broken surface		fine silky
Elongation of inch sections		".14, ".31*, ".11

No. 6160.

Marks, A. R–2
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001700	.000333	.....	.....	
12,000	60,000	.002033	.000333	0.	.....	
12,200	61,000	.002067	.000084	.....	.....	
12,400	62,000	.002100	.000033	.....	.....	Elastic limit.
12,600	63,000	.010333	.008233	.....	.....	
12,800	64,000	.010800	.000467	.....	.....	
13,000	65,000	.011267	.000467	.....	.....	
13,200	66,000	.011700	.000433	.....	.....	
13,600	68,000	.013567	.001867	.....	.....	
14,000	70,000	.015000	.001433	.....	.....	
14,400	72,000	.016600	.001600	.....	.....	
15,200	76,000	.020167	.003567	.....	.....	
16,000	80,000	.024200	.004033	.....	.....	
16,800	84,000	.027667	.003467	.....	.....	
17,600	88,000	.032967	.005300	.....	.....	
18,400	92,000	.038100	.005133	.....	.....	
19,200	96,000	.044333	.006233	.....	.....	
20,000	100,000	.053000	.008667	.....	.....	
20,800	104,000	.066000	.013000	.....	.....	
21,600	108,000	.0900	.0240	.....	.....	
21,910	109,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	109,550
Elastic limit per square inch of original section	do...	62,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent. of original section		37.1
Position of rupture		".85 from neck
Character of broken surface		fine silky
Elongation of inch sections		".10, ".13, ".28*

RIFLE-BARREL STEEL, .30-CALIBER—

No. 6262.

Marks, 78 B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
200	1,000	0.	0.	0.	0.	
1,000	5,000	.000133	.000133	0.		
2,000	10,000	.000300	.000167			
4,000	20,000	.000667	.000367			
6,000	30,000	.001000	.000333	0.		
8,000	40,000	.001333	.000333			Elastic limit.
10,000	50,000	.001700	.000367	0.		
12,000	60,000	.002033	.000333			
14,000	70,000	.002400	.000367			
14,200	71,000	.002433	.000033			
14,400	72,000	.002533	.000100			
14,600	73,000	.002667	.000134			
14,800	74,000	.005500	.002833			
15,000	75,000	.005667	.000167			
15,200	76,000	.006033	.000366			
15,400	77,000	.006600	.000567			
15,600	78,000	.007167	.000567			
16,000	80,000	.008300	.001133			
16,400	82,000	.009333	.001033			
16,800	84,000	.010467	.001134			
17,200	86,000	.011500	.001033			
17,600	88,000	.012833	.001333			
18,400	92,000	.015333	.002500			
19,200	96,000	.018000	.002667			
20,000	100,000	.020733	.002733			
20,800	104,000	.023433	.002700			
21,600	108,000	.027000	.003567			
22,400	112,000	.030400	.003400			
23,200	116,000	.034667	.004267			
24,000	120,000	.039933	.005266			
24,800	124,000	.046000	.006067			
25,600	128,000	.055333	.009333			
26,710	133,550					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	133,550
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".3 from neck
Character of broken surface		fine silky
Elongation of inch sections		".14, ".24*, ".07

No. 6263.

Marks, 78 B R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000800	.000167	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	0.	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	.....	.....	Elastic limit.
12,200	61,000	.002967	.000934	.....	.....	
12,400	62,000	.003933	.000966	.....	.....	
12,600	63,000	.005600	.001667	.....	.....	
12,800	64,000	.005833	.000233	.....	.....	
13,000	65,000	.006267	.000434	.....	.....	
13,200	66,000	.006767	.000500	.....	.....	
13,600	68,000	.007967	.001200	.....	.....	
14,000	70,000	.009133	.001166	.....	.....	
14,400	72,000	.010267	.001134	.....	.....	
15,200	76,000	.012567	.002300	.....	.....	
16,000	80,000	.015033	.002466	.....	.....	
16,800	84,000	.017167	.002134	.....	.....	
17,600	88,000	.020167	.003000	.....	.....	
18,400	92,000	.023333	.003166	.....	.....	
19,200	96,000	.026667	.003334	.....	.....	
20,000	100,000	.030067	.003400	.....	.....	
20,800	104,000	.034000	.003933	.....	.....	
21,600	108,000	.039667	.005667	.....	.....	
22,400	112,000	.044500	.004833	.....	.....	
23,200	116,000	.054933	.010433	.....	.....	
24,640	123,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	123,200
Elastic limit per square inch of original section	do...	60,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.002083
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent. of original section		34.0
Position of rupture		1". 4 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		".13, ".25*, ".09

No. 6264.

Marks, 78 R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.		
2,000	10,000	.000300	.000167			
4,000	20,000	.000633	.000333			
6,000	30,000	.000967	.000334			
8,000	40,000	.001300	.000333	0.		
10,000	50,000	.001667	.000367	0.		
12,000	60,000	.002000	.000333			
12,200	61,000	.002033	.000033			
12,400	62,000	.002067	.000034			
12,600	63,000	.002133	.000066			
12,800	64,000	.002200	.000067			Elastic limit.
13,000	65,000	.009000	.006800			
13,200	66,000	.010067	.001067			
13,400	67,000	.010400	.000333			
13,600	68,000	.011000	.000600			
13,800	69,000	.011667	.000667			
14,000	70,000	.012367	.000700			
14,400	72,000	.013933	.001566			
14,800	74,000	.015333	.001400			
15,200	76,000	.017000	.001667			
15,600	78,000	.018333	.001333			
16,000	80,000	.020200	.001867			
16,800	84,000	.023667	.003467			
17,600	88,000	.027833	.004166			
18,400	92,000	.032500	.004667			
19,200	96,000	.038000	.005500			
20,000	100,000	.044667	.006667			
20,800	104,000	.053333	.008666			
21,600	108,000	.068333	.015000			
22,400	112,000					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,000
Elastic limit per square inch of original section	do..	64,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.002200
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".13, ".85*, ".13

No. 6265.

Marks, 78 R. R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000267	.000167	.....	.....	
4,000	20,000	.000600	.000333	.....	.....	
6,000	30,000	.000933	.000333	.....	.....	
8,000	40,000	.001800	.000867	0.	.....	
10,000	50,000	.001600	.000800	.....	.....	
11,000	55,000	.001800	.000200	.....	.....	
11,200	56,000	.001833	.000033	.....	.....	
11,400	57,000	.001867	.000034	.....	.....	
11,600	58,000	.001933	.000066	.....	.....	Elastic limit.
11,800	59,000	.010667	.008734	.....	.....	
12,000	60,000	.011733	.001066	.....	.....	
12,400	62,000	.012500	.000767	.....	.....	
12,800	64,000	.013933	.001433	.....	.....	
13,200	66,000	.015500	.001567	.....	.....	
13,600	68,000	.017167	.001667	.....	.....	
14,400	72,000	.021000	.003833	.....	.....	
15,200	76,000	.025000	.004000	.....	.....	
16,000	80,000	.028833	.003833	.....	.....	
16,800	84,000	.034000	.005167	.....	.....	
17,600	88,000	.040000	.006000	.....	.....	
18,400	92,000	.049000	.009000	.....	.....	
19,200	96,000	.058333	.009333	.....	.....	
20,000	100,000	.077000	.018667	.....	.....	
20,870	104,350	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,350
Elastic limit per square inch of original section	do...	58,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001933
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1".5 from neck
Character of broken surface		fine silky
Elongation of inch sections		".14, ".33*, ".14

No. 6289.

Marks, A. I. G.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001633	.000333	0.	.....	
12,000	60,000	.001967	.000334	.....	.....	
14,000	70,000	.002300	.000333	.....	.....	
15,000	75,000	.002467	.000167	.....	.....	
15,200	76,000	.002500	.000033	.....	.....	Elastic limit
15,400	77,000	.003000	.000500	.....	.....	
		.010000	.007000	.....	.....	
15,600	78,000	.010933	.000933	.....	.....	
15,800	79,000	.011333	.000400	.....	.....	
16,000	80,000	.012167	.000834	.....	.....	
16,400	82,000	.013000	.000833	.....	.....	
16,800	84,000	.014567	.001567	.....	.....	
17,200	86,000	.015733	.001166	.....	.....	
17,600	88,000	.017333	.001600	.....	.....	
18,000	90,000	.019167	.001834	.....	.....	
18,400	92,000	.020333	.001166	.....	.....	
19,200	96,000	.023667	.003334	.....	.....	
20,000	100,000	.027067	.003400	.....	.....	
20,800	104,000	.030667	.003600	.....	.....	
21,600	108,000	.035000	.004333	.....	.....	
22,400	112,000	.0433	.0083	.....	.....	
23,200	116,000	.0500	.0067	.....	.....	
24,000	120,000	.0600	.0100	.....	.....	
24,800	124,000	.0767	.0167	.....	.....	
25,310	126,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	126,550
Elastic limit per square inch of original section	do...	76,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.002500
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".5 from neck
Character of broken surface		fine silky, dark gray
Elongation of inch sections		".11, ".28, ".12

No. 6290.

Marks, A I R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000167	.000167	0.	.....	
2,000	10,000	.000333	.000166	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.001967	.000300	.....	.....	
13,600	68,000	.002300	.000333	.....	.....	
13,800	69,000	.002333	.000033	.....	.....	Elastic limit.
14,000	70,000	.017333	.005000	.....	.....	
14,200	71,000	.017967	.000634	.....	.....	
14,400	72,000	.018933	.000966	.....	.....	
14,600	73,000	.020000	.001067	.....	.....	
14,800	74,000	.020833	.000833	.....	.....	
15,200	76,000	.022667	.001834	.....	.....	
15,600	78,000	.025167	.002500	.....	.....	
16,000	80,000	.027400	.002233	.....	.....	
16,800	84,000	.032333	.004933	.....	.....	
17,600	88,000	.038167	.005834	.....	.....	
18,400	92,000	.0500	.011833	.....	.....	
19,200	96,000	.0600	.0100	.....	.....	
20,000	100,000	.0733	.0133	.....	.....	
20,800	104,000	.1167	.0434	.....	.....	
20,920	104,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,600
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.2233
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1".6 from neck
Character of broken surface		fine silky, dark gray
Elongation of inch sections		".13, ".38*, ".16

No. 6291.

Marks, A I W.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001800	.000333	.....	.....	
10,000	50,000	.001667	.000367	0.	.....	
12,000	60,000	.001967	.000300	.....	.....	
14,000	70,000	.002333	.000366	.....	.....	
15,600	78,000	.002600	.000267	.....	.....	
15,800	79,000	.002633	.000033	.....	.....	Elastic limit.
16,000	80,000	.008767	.006134	.....	.....	
16,200	81,000	.009333	.000566	.....	.....	
16,400	82,000	.009700	.000367	.....	.....	
16,600	83,000	.010333	.000633	.....	.....	
16,800	84,000	.010800	.000467	.....	.....	
17,200	86,000	.012000	.001200	.....	.....	
17,600	88,000	.013000	.001000	.....	.....	
18,000	90,000	.015000	.002000	.....	.....	
18,400	92,000	.016100	.001100	.....	.....	
19,200	96,000	.018067	.001967	.....	.....	
20,000	100,000	.021033	.002966	.....	.....	
20,800	104,000	.023833	.002800	.....	.....	
21,600	108,000	.026833	.003000	.....	.....	
22,400	112,000	.030667	.003834	.....	.....	
23,200	116,000	.035000	.004333	.....	.....	
24,000	120,000	.039667	.004667	.....	.....	
24,800	124,000	.0467	.007033	.....	.....	
25,600	128,000	.0567	.0100	.....	.....	
26,400	132,000	.0767	.0200	.....	.....	
26,890	134,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	134,450
Elastic limit per square inch of original section	do...	79,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.002633
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		at middle of stem
Character of broken surface		fine silky, dark gray
Elongation of inch sections		".10, ".26, ".11

No. 6292.

Marks, 78 B X.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	0.	.....	
10,000	50,000	.001633	.000333	.....	.....	
12,000	60,000	.001967	.000334	.....	.....	
14,000	70,000	.002333	.000366	.....	.....	
15,000	75,000	.002500	.000167	.....	.....	Elastic limit.
15,200	76,000	.004667	.002167	.....	.....	
15,400	77,000	.005000	.000333	.....	.....	
15,600	78,000	.005333	.000333	.....	.....	
15,800	79,000	.005767	.000434	.....	.....	
16,000	80,000	.006600	.000833	.....	.....	
16,400	82,000	.007433	.000833	.....	.....	
16,800	84,000	.008400	.000967	.....	.....	
17,200	86,000	.009633	.001233	.....	.....	
17,600	88,000	.010967	.001334	.....	.....	
18,000	90,000	.011767	.000800	.....	.....	
18,800	94,000	.014000	.002233	.....	.....	
19,600	98,000	.017067	.003067	.....	.....	
20,400	102,000	.021000	.003933	.....	.....	
21,200	106,000	.022500	.001500	.....	.....	
22,000	110,000	.024667	.002167	.....	.....	
22,600	113,000	.027633	.002966	.....	.....	
27,210	136,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	136,050
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1533
Elongation per inch under strain at elastic limit		.002500
Reduction in diameter at point of rupture		.125
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		$\frac{7}{16}$ from neck
Character of broken surface		silky interspersed with fine granulation, cup shaped
Elongation of inch sections		$\frac{7}{16}$, .20*, $\frac{7}{16}$, .17*, $\frac{7}{16}$, .09

No. 6293.

Marks, 78 B R X.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000167	.000167	0.	.....	
2,000	10,000	.000300	.000133	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001633	.000333	.....	.....	
12,000	60,000	.001967	.000334	.....	.....	
12,400	62,000	.002033	.000066	.....	.....	
12,800	64,000	.002100	.000067	.....	.....	
13,200	66,000	.002200	.000100	.....	.....	
13,600	68,000	.002267	.000067	.....	.....	
14,000	70,000	.002333	.000066	.....	.....	
14,200	71,000	.002367	.000034	.....	.....	Elastic limit.
14,400	72,000	.003967	.001600	.....	.....	
14,800	74,000	.005467	.001500	.....	.....	
15,200	76,000	.006300	.002833	.....	.....	
15,600	78,000	.006933	.000633	.....	.....	
16,000	80,000	.009967	.001034	.....	.....	
16,800	84,000	.011800	.001833	.....	.....	
17,600	88,000	.014967	.003167	.....	.....	
18,400	92,000	.017233	.002266	.....	.....	
19,200	96,000	.019800	.002567	.....	.....	
20,000	100,000	.022400	.002600	.....	.....	
20,800	104,000	.025133	.002733	.....	.....	
21,600	108,000	.028733	.003600	.....	.....	
22,400	112,000	.032867	.004134	.....	.....	
23,200	116,000	.036633	.003766	.....	.....	
24,000	120,000	.042300	.005667	.....	.....	
26,520	132,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	132,600
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.002367
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		"1.03 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".27*, ".11 ".07

No. 6294.

Marks, 78 B R *.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000800	.000167	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
12,000	60,000	.002033	.000366	.....	.....	
12,400	62,000	.002067	.000034	.....	.....	
12,800	64,000	.002133	.000066	.....	.....	
13,200	66,000	.002200	.000067	.....	.....	
13,600	68,000	.002300	.000100	.....	.....	
14,000	70,000	.002400	.000100	.....	.....	
14,200	71,000	.002400	0.	.....	.....	
14,400	72,000	.002433	.000033	.....	.....	
14,600	73,000	.002467	.000034	.....	.....	
14,800	74,000	.002500	.000033	.....	.....	Elastic limit.
15,000	75,000	.008067	.005567	.....	.....	
15,200	76,000	.008500	.000433	.....	.....	
15,600	78,000	.009633	.001133	.....	.....	
16,000	80,000	.010700	.001067	.....	.....	
16,800	84,000	.013633	.002933	.....	.....	
17,600	88,000	.015400	.001767	.....	.....	
18,400	92,000	.021467	.006067	.....	.....	
19,200	96,000	.021900	.000433	.....	.....	
20,000	100,000	.023800	.001900	.....	.....	
20,800	104,000	.026400	.002600	.....	.....	
21,600	108,000	.030733	.001333	.....	.....	
22,400	112,000	.034400	.003667	.....	.....	
23,200	116,000	.039067	.004667	.....	.....	
24,000	120,000	.045067	.006000	.....	.....	
26,100	130,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	130,500
Elastic limit per square inch of original section	do...	74,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.002500
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		".6 from neck
Character of broken surface		fine silky; cup shaped
Elongation of inch sections		".09, ".30*, ".10

No. 6306.

Marks, A I B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000267	.000167	.....	.....	
4,000	20,000	.000600	.000333	.....	.....	
6,000	30,000	.000933	.000333	.....	.....	
8,000	40,000	.001300	.000367	.....	.....	
10,000	50,000	.001633	.000333	0.	.....	
12,000	60,000	.001967	.000334	.....	.....	
14,000	70,000	.002333	.000366	.....	.....	
14,400	72,000	.002400	.000067	.....	.....	
14,600	73,000	.002433	.000033	.....	.....	Elastic limit.
14,800	74,000	.011000	.008567	.....	.....	
15,000	75,000	.011333	.000333	.....	.....	
15,200	76,000	.012000	.000667	.....	.....	
15,600	78,000	.012000	.000600	.....	.....	
16,000	80,000	.013333	.001333	.....	.....	
16,800	84,000	.016667	.002334	.....	.....	
17,600	88,000	.020667	.004000	.....	.....	
18,400	92,000	.023667	.003000	.....	.....	
19,200	96,000	.027333	.003666	.....	.....	
20,000	100,000	.034667	.007334	.....	.....	
20,800	104,000	.036767	.002100	.....	.....	
21,600	108,000	.042000	.005233	.....	.....	
22,400	112,000	.050767	.008767	.....	.....	
23,200	116,000	.060000	.009233	.....	.....	
24,000	120,000	.080000	.020000	.....	.....	
24,510	122,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	122,550
Elastic limit per square inch of original section	do...	73,000
Elongation per inch after rupture	inch..	.1833
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1".34 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".11, ".29*, ".15

No. 6307.

Marks, A I B 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	.....	
2,000	10,000	.000300	.000233	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002033	.000333	.....	.....	
14,000	70,000	.002367	.000334	.....	.....	
15,000	75,000	.002567	.000200	.....	.....	
16,000	80,000	.002733	.000166	.....	.....	
16,200	81,000	.002800	.000067	.....	.....	Elastic limit.
16,400	82,000	.003333	.000533	.....	.....	
		.008000	.004667	.....	.....	
16,600	83,000	.008433	.000433	.....	.....	
16,800	84,000	.008733	.000300	.....	.....	
17,200	86,000	.010000	.001267	.....	.....	
17,600	88,000	.011267	.001267	.....	.....	
18,400	92,000	.013500	.002233	.....	.....	
19,200	96,000	.016000	.002500	.....	.....	
20,000	100,000	.018667	.002667	.....	.....	
20,800	104,000	.020667	.002000	.....	.....	
21,600	108,000	.023500	.002833	.....	.....	
22,400	112,000	.026667	.003167	.....	.....	
23,200	116,000	.030000	.003333	.....	.....	
24,000	120,000	.034000	.004000	.....	.....	
24,800	124,000	.038667	.004667	.....	.....	
27,890	139,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	139,450
Elastic limit per square inch of original section	do...	81,000
Elongation per inch after rupture	inch..	.1467
Elongation per inch under strain at elastic limit	do...	.002800
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		at middle of stern
Character of broken surface		silky, interspersed with fine granulation radiating from the center.
Elongation of inch sections		".10, ".24*, ".10

No. 6308.

Marks, A I Y.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	.0	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001700	.000333	0.	.....	
12,000	60,000	.002167	.000467	.....	.....	
13,400	67,000	.002333	.000166	.....	.....	Elastic limit.
13,600	68,000	.003333	.001000	.....	.....	
		.019333	.016000	.....	.....	
13,800	69,000	.020333	.001000	.....	.....	
14,000	70,000	.020933	.000600	.....	.....	
14,200	71,000	.022000	.001067	.....	.....	
14,400	72,000	.023167	.001167	.....	.....	
14,800	74,000	.025333	.002166	.....	.....	
15,200	76,000	.028000	.002667	.....	.....	
16,000	80,000	.034000	.006000	.....	.....	
16,800	84,000	.041000	.007000	.....	.....	
17,600	88,000	.050000	.009000	.....	.....	
18,400	92,000	.063333	.013333	.....	.....	
19,200	96,000	.083333	.020000	.....	.....	
19,900	99,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,500
Elastic limit per square inch of original section	do...	67,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		54.6
Position of rupture		1".6 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".15, ".41*, ".16

No. 6309.

Marks, A I R 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001700	.000333	0.	.....	
12,000	60,000	.002067	.000367	.....	.....	
13,800	69,000	.002400	.000333	.....	.....	Elastic limit.
14,000	70,000	.016333	.013933	.....	.....	
14,200	71,000	.017667	.001334	.....	.....	
14,400	72,000	.019867	.002200	.....	.....	
15,200	76,000	.022667	.002800	.....	.....	
16,000	80,000	.027767	.005100	.....	.....	
16,800	84,000	.032333	.004566	.....	.....	
17,600	88,000	.038333	.006000	.....	.....	
18,400	92,000	.046667	.008334	.....	.....	
19,200	96,000	.055333	.008666	.....	.....	
20,000	100,000	.068333	.013000	.....	.....	
21,090	105,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,450
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		54.6
Position of rupture		1".4 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		#.13, #.34*, #.19

No. 6310.

Marks, A I R R 1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002033	.000333	.....	.....	
13,000	65,000	.002200	.000167	.....	.....	Elastic limit.
13,200	66,000	.016667	.014467	.....	.....	
13,400	67,000	.017400	.000733	.....	.....	
13,600	68,000	.018600	.001200	.....	.....	
14,000	70,000	.020367	.001767	.....	.....	
14,400	72,000	.022333	.001966	.....	.....	
15,200	76,000	.027067	.004734	.....	.....	
16,000	80,000	.032167	.005100	.....	.....	
16,800	84,000	.037400	.005233	.....	.....	
17,600	88,000	.045000	.007600	.....	.....	
18,400	92,000	.053667	.008667	.....	.....	
19,200	96,000	.065667	.012000	.....	.....	
20,420	102,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of orignal section	pounds..	102,100
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	.2167
Elongation per inch under strain at elastic limit	do...	.002200
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1″.4 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.12, ″.33*, ″.20

No. 6311.

Marks, A I R 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	.....	
2,000	10,000	.000800	.000233	.....	.....	
4,000	20,000	.000633	.000833	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002367	.000367	.....	.....	
14,200	71,000	.002400	.000033	.....	.....	
14,400	72,000	.002433	.000033	.....	.....	Elastic limit.
14,600	73,000	.014000	.011567	.....	.....	
14,800	74,000	.014667	.000667	.....	.....	
15,000	75,000	.015500	.000833	.....	.....	
15,200	76,000	.016333	.000833	.....	.....	
15,600	78,000	.017833	.001500	.....	.....	
16,000	80,000	.019833	.002000	.....	.....	
16,800	84,000	.022667	.002834	.....	.....	
17,600	88,000	.028333	.005666	.....	.....	
18,400	92,000	.033000	.004667	.....	.....	
19,200	96,000	.038333	.005333	.....	.....	
20,000	100,000	.045000	.006667	.....	.....	
20,800	104,000	.053333	.008333	.....	.....	
22,600	113,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	113,000
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.1967
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".13, ".33*, ".13

No. 6312.

Marks, A I R R 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002000	.000300	.....	.....	
14,000	70,000	.002333	.000333	.....	.....	
15,000	75,000	.002500	.000167	.....	.....	Elastic limit.
15,200	76,000	.022767	.020267	.....	.....	
15,400	77,000	.023833	.001066	.....	.....	
15,600	78,000	.025333	.001500	.....	.....	
16,000	80,000	.027167	.001834	.....	.....	
16,800	84,000	.032333	.005166	.....	.....	
17,600	88,000	.038000	.005667	.....	.....	
18,400	92,000	.044667	.006667	.....	.....	
19,200	96,000	.053833	.009166	.....	.....	
20,000	100,000	.065000	.011167	.....	.....	
21,600	108,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,000
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.002500
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1".29 from neck
Character of broken surface		fine silky
Elongation of inch sections		".29*, ".23*, ".12

No. 6313.

Marks, A I R 3.
Diameter, ".505.
Sectional area .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002033	.000366	.....	.....	
13,600	68,000	.002267	.000234	.....	.....	
13,800	69,000	.002300	.000033	.....	.....	Elastic limit.
14,000	70,000	.019333	.017033	.....	.....	
14,200	71,000	.020433	.001100	.....	.....	
14,400	72,000	.021433	.001000	.....	.....	
14,800	74,000	.022833	.001400	.....	.....	
15,200	76,000	.026000	.003167	.....	.....	
16,000	80,000	.031000	.005000	.....	.....	
16,800	84,000	.037000	.006000	.....	.....	
17,600	88,000	.045000	.008000	.....	.....	
18,400	92,000	.054333	.009333	.....	.....	
19,200	96,000	.068000	.013667	.....	.....	
20,000	100,000	.095667	.027667	.....	.....	
20,560	102,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,800
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.2367
Elongation per inch under strain at elastic limit	do...	.002300
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		54.6
Position of rupture		1".6 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".15, ".40*, ".16

No. 6314.

Marks, A I R R 3.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002333	.000333	.....	.....	Elastic limit.
		.026667	.024334	.....	.....	
14,200	71,000	.027333	.000666	.....	.....	
14,400	72,000	.028333	.001000	.....	.....	
14,800	74,000	.030667	.002334	.....	.....	
15,200	76,000	.034333	.003666	.....	.....	
16,000	80,000	.041667	.007334	.....	.....	
16,800	84,000	.050733	.009066	.....	.....	
17,600	88,000	.062000	.011267	.....	.....	
18,400	92,000	.078000	.016000	.....	.....	
19,420	97,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,100
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.2467
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		1".4 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".14, ".39*, ".21

No. 6317.

Marks, 78 U.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	.....	
2,000	10,000	.000800	.000233	.....	.....	
4,000	20,000	.000633	.000833	.....	.....	
6,000	30,000	.001000	.000867	.....	.....	
8,000	40,000	.001333	.000833	.....	.....	
10,000	50,000	.001667	.000834	0.	.....	
12,000	60,000	.002000	.000833	.....	.....	
14,000	70,000	.002367	.000867	.....	.....	
15,000	75,000	.002533	.000166	.....	.....	Elastic limit.
15,200	76,000	.009333	.006800	.....	.....	
15,400	77,000	.010000	.000667	.....	.....	
15,600	78,000	.010333	.000333	.....	.....	
16,000	80,000	.011333	.001000	.....	.....	
16,400	82,000	.012267	.000934	.....	.....	
16,800	84,000	.013667	.001400	.....	.....	
17,600	88,000	.016667	.003000	.....	.....	
18,400	92,000	.019733	.003066	.....	.....	
19,200	96,000	.022667	.002934	.....	.....	
20,000	100,000	.026000	.003333	.....	.....	
20,800	104,000	.030000	.004000	.....	.....	
21,600	108,000	.034000	.004000	.....	.....	
22,400	112,000	.039333	.005333	.....	.....	
23,200	116,000	.046500	.007167	.....	.....	
25,320	126,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	126,600
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1733
Elongation per inch under strain at elastic limit	do...	.002533
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		$\frac{1}{2}$".10, $\frac{3}{4}$".30*, $\frac{1}{2}$".12

No. 6318.

Marks, 78 U B.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
13,600	68,000	.002267	.000267	.....	.....	Elastic limit.
13,800	69,000	.021000	.018733	.....	.....	
14,000	70,000	.022333	.001333	.....	.....	
14,200	71,000	.023267	.000934	.....	.....	
14,400	72,000	.024333	.001066	.....	.....	
14,800	74,000	.026333	.002000	.....	.....	
15,200	76,000	.029333	.003000	.....	.....	
15,600	78,000	.032000	.002667	.....	.....	
16,000	80,000	.035167	.003167	.....	.....	
16,800	84,000	.042500	.007333	.....	.....	
17,600	88,000	.051667	.009167	.....	.....	
18,400	92,000	.062000	.010333	.....	.....	
20,210	101,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,050
Elastic limit per square inch of original section	do...	68,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.002267
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1".1 from neck
Character of broken surface		fine, silky, cup shaped
Elongation of inch sections		".34", ".19, ".11

No. 6337.

Marks, S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001633	.000333	0.	.....	
12,000	60,000	.001967	.000334	.....	.....	
14,000	70,000	.002333	.000366	.....	.....	Elastic limit.
		.004200	.001867	.....	.....	
14,200	71,000	.004533	.000333	.....	.....	
14,400	72,000	.004967	.000434	.....	.....	
14,600	73,000	.005300	.000333	.....	.....	
14,800	74,000	.005767	.000467	.....	.....	
15,200	76,000	.007000	.001233	.....	.....	
15,600	78,000	.007833	.000833	.....	.....	
16,000	80,000	.008900	.001067	.....	.....	
16,800	84,000	.011067	.002167	.....	.....	
17,600	88,000	.013333	.002266	.....	.....	
18,400	92,000	.015700	.002367	.....	.....	
19,200	96,000	.018000	.002300	.....	.....	
20,000	100,000	.020700	.002700	.....	.....	
26,410	132,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	132,050
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.1600
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".5 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".09, ".29*, ".10

No. 6338.

Marks, C S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002000	.000300	.....	.....	
13,200	66,000	.002233	.000233	.....	.....	Elastic limit.
13,400	67,000	.006667	.004434	.....	.....	
13,600	68,000	.007267	.000600	.....	.....	
13,800	69,000	.007667	.000400	.....	.....	
14,000	70,000	.008000	.000333	.....	.....	
14,400	72,000	.009233	.001233	.....	.....	
14,800	74,000	.010233	.001000	.....	.....	
15,200	76,000	.011333	.001100	.....	.....	
15,600	78,000	.012400	.001067	.....	.....	
16,000	80,000	.013567	.001167	.....	.....	
16,800	84,000	.016433	.002866	.....	.....	
17,600	88,000	.018667	.002234	.....	.....	
18,400	92,000	.021700	.003033	.....	.....	
19,200	96,000	.024333	.002633	.....	.....	
20,000	100,000	.028000	.003667	.....	.....	
25,100	125,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	125,500
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	.1600
Elongation per inch under strain at elastic limit	do...	.002233
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".48 from neck
Character of broken surface		fine silky
Elongation of inch sections		".11, ".27*, ".10

No. 6339.

Marks, S ✠
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001733	.000366	.000033	.000033	
12,000	60,000	.002033	.000300	.....	.....	
13,800	69,000	.002367	.000334	.....	.....	Elastic limit.
14,000	70,000	.003933	.001566	.....	.....	
14,200	71,000	.004267	.000334	.....	.....	
14,400	72,000	.004633	.000366	.....	.....	
14,600	73,000	.005000	.000367	.....	.....	
14,800	74,000	.005433	.000433	.....	.....	
15,200	76,000	.006333	.000900	.....	.....	
15,600	78,000	.007300	.000967	.....	.....	
16,000	80,000	.008667	.001367	.....	.....	
16,800	84,000	.010100	.001433	.....	.....	
17,600	88,000	.012667	.002567	.....	.....	
18,400	92,000	.015167	.002500	.....	.....	
19,200	96,000	.017583	.002366	.....	.....	
20,000	100,000	.020333	.002800	.....	.....	
26,730	133,650	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	133,650
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.002367
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.44 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.09, ″.28*, ″.12

No. 6340.

Marks, S S ✠.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,200	51,000	.001700	.000367	0.	.....	
12,000	60,000	.002067	.000367	.....	.....	
14,000	70,000	.002433	.000366	.....	.....	Elastic limit.
14,200	71,000	.002533	.000100	.....	.....	
14,400	72,000	.003000	.000467	.....	.....	
14,600	73,000	.004600	.001600	.....	.....	
14,800	74,000	.005033	.000433	.....	.....	
15,000	75,000	.005500	.000467	.....	.....	
15,200	76,000	.005933	.000433	.....	.....	
15,600	78,000	.006900	.000967	.....	.....	
16,000	80,000	.008000	.001100	.....	.....	
16,800	84,000	.010000	.002000	.....	.....	
17,600	88,000	.012667	.002667	.....	.....	
18,400	92,000	.014500	.001833	.....	.....	
19,200	96,000	.017333	.002833	.....	.....	
20,000	100,000	.019667	.002334	.....	.....	
26,710	133,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	133,550
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.1467
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1."06 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".23*, ".14", .07

Barrel Steel, Annealed in Charcoal.

No. 6357.

Marks, S C ✠.
Diameter ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001633	.000300	0.	.....	
10,200	51,000	.001667	.000034	.....	.....	
10,400	52,000	.001700	.000033	.....	.....	
10,600	53,000	.001733	.000033	.....	.....	
10,800	54,000	.001767	.000034	.....	.....	Elastic limit.
11,000	55,000	.006333	.004566	.....	.....	
11,200	56,000	.007000	.000667	.....	.....	
11,600	58,000	.007833	.000833	.....	.....	
12,000	60,000	.009067	.001234	.....	.....	
12,400	62,000	.010167	.001100	.....	.....	
12,800	64,000	.011233	.001066	.....	.....	
13,600	68,000	.014367	.003134	.....	.....	
14,400	72,000	.016333	.001966	.....	.....	
15,200	76,000	.018667	.002334	.....	.....	
16,000	80,000	.021333	.002666	.....	.....	
16,800	84,000	.025600	.004267	.....	.....	
17,600	88,000	.028900	.003300	.....	.....	
18,400	92,000	.033167	.004267	.....	.....	
19,200	96,000	.037400	.004233	.....	.....	
20,000	100,000	.043333	.005933	.....	.....	
22,600	113,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	113,000
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1".4 from neck
Character of broken surface		silky, interspersed with fine granulation
Elongation of inch sections		".13, ".23*, ".11

HOLLOW SPECIMEN FROM BUTT OF BARREL AFTER SPECIAL TREATMENT.

No. 6369.

Marks, S O.
Exterior diameter, ".588.
Interior diameter, ".295.
Sectional area, .203 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
208	1,000	0.	0.	0.	0.	Initial load.
1,015	5,000	.000133	.000133	0.	.....	
2,030	10,000	.000333	.000200	.....	.....	
4,060	20,000	.000667	.000334	.....	.....	
6,090	30,000	.001000	.000333	.....	.....	
8,120	40,000	.001333	.000333	0.	.....	
8,323	41,000	.001400	.000067	.....	.....	
8,526	42,000	.001467	.000067	.....	.....	
8,729	43,000	.001567	.000100	.....	.....	Elastic limit not well defined.
8,932	44,000	.001733	.000166	.....	.....	
9,135	45,000	.001933	.000200	.....	.....	
9,338	46,000	.002100	.000167	.....	.....	
9,541	47,000	.002367	.000267	.....	.....	
9,744	48,000	.003833	.001466	.....	.....	
9,947	49,000	.004933	.001100	.....	.....	
10,150	50,000	.005300	.000367	.003333	.003333	
10,556	52,000	.006667	.001367	.....	.....	
10,962	54,000	.007667	.001000	.....	.....	
11,368	56,000	.008667	.001000	.....	.....	
11,774	58,000	.010067	.001400	.....	.....	
12,180	60,000	.011000	.000933	.....	.....	
12,992	64,000	.013400	.002400	.....	.....	
13,804	68,000	.016083	.002683	.....	.....	
14,616	72,000	.019067	.003084	.....	.....	
15,428	76,000	.021700	.002633	.....	.....	
16,240	80,000	.025633	.003933	.....	.....	
17,052	84,000	.029333	.003700	.....	.....	
17,864	88,000	.033733	.004400	.....	.....	
18,676	92,000	.039267	.005534	.....	.....	
19,488	96,000	.045333	.006066	.....	.....	
20,300	100,000	.054667	.009334	.....	.....	
21,980	108,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,280
Elastic limit per square inch of original section, not well defined	do...	43,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.001567
Reduction in diameter at point of rupture (exterior)	do...	.078
Position of rupture		1".6 from neck
Character of broken surface		granular 85 per cent, silky 15 per cent
Elongation of inch sections		".11, ".25*, ".13

Rolled Barrel Annealed in Charcoal.

No. 6373.

Marks, S C L.
Diameter, ".505.
Sectional area, .30 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001267	.000267	0.	.....	
10,000	50,000	.001700	.000333	.....	.....	
11,000	55,000	.001833	.000133	.....	.....	
11,200	56,000	.001900	.000067	.....	.....	Elastic limit.
11,400	57,000	.003667	.001767	.....	.....	
11,600	58,000	.005667	.002000	.....	.....	
11,800	59,000	.007067	.001400	.....	.....	
12,000	60,000	.007733	.000666	.....	.....	
12,400	62,000	.009367	.001634	.....	.....	
12,800	64,000	.010333	.000966	.....	.....	
13,600	68,000	.012867	.002534	.....	.....	
14,400	72,000	.014667	.001800	.....	.....	
15,200	76,000	.017867	.003200	.....	.....	
16,000	80,000	.020100	.002233	.....	.....	
16,800	84,000	.023000	.002900	.....	.....	
17,600	88,000	.027000	.004000	.....	.....	
18,400	92,000	.030767	.003767	.....	.....	
19,200	96,000	.035067	.004300	.....	.....	
20,000	100,000	.040833	.005766	.....	.....	
22,790	113,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	113,950
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.1600
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		".85 from neck
Character of broken surface		silky, interspersed with fine granulations
Elongation of inch sections		".09, ".13, ".26"

ROLLED BARREL ANNEALED IN LIME.

No. 6374.

Marks, S L.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000667	.000867	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	0.	.....	
10,000	50,000	.001700	.000367	.....	.....	
12,000	60,000	.002033	.000333	.....	.....	
12,200	61,000	.002067	.000034	.....	.....	
12,400	62,000	.002100	.000033	.....	.....	Elastic limit.
12,600	63,000	.003500	.001400	.....	.....	
12,800	64,000	.003733	.000233	.....	.....	
13,000	65,000	.004267	.000534	.....	.....	
13,200	66,000	.004667	.000400	.....	.....	
13,600	68,000	.005367	.000700	.....	.....	
14,000	70,000	.006533	.001166	.....	.....	
14,400	72,000	.007333	.000800	.....	.....	
15,200	76,000	.009567	.002234	.....	.....	
16,000	80,000	.011667	.002100	.....	.....	
16,800	84,000	.013833	.002166	.....	.....	
17,600	88,000	.016300	.002467	.....	.....	
18,400	92,000	.019000	.002700	.....	.....	
19,200	96,000	.022000	.003000	.....	.....	
20,000	100,000	.024667	.002667	.....	.....	
25,570	127,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	127,850
Elastic limit per square inch of original section	do...	62,000
Elongation per inch after rupture	inch..	.13333
Elongation per inch under strain at elastic limit	do...	.002160
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		at middle of stem
Character of broken surface		silky center, fine granular at the circumference
Elongation of inch sections		".08, ".22*, ".10

Rolled Barrel Annealed in Sand.

No. 6375.

Marks, S S S.
Diameter ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	.....	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	0.	.....	
10,000	50,000	.001700	.000366	.....	.....	
12,000	60,000	.002033	.000333	.....	.....	
12,200	61,000	.002100	.000067	.....	.....	
12,400	62,000	.002167	.000067	.....	.....	
12,600	63,000	.002233	.000066	.....	.....	
12,800	64,000	.002300	.000067	.....	.....	
13,000	65,000	.002333	.000033	.....	.....	Elastic limit.
13,200	66,000	.002933	.000600	.....	.....	
13,400	67,000	.003300	.000367	.....	.....	
13,600	68,000	.005000	.001700	.....	.....	
13,800	69,000	.005267	.000267	.....	.....	
14,000	70,000	.005700	.000433	.....	.....	
14,400	72,000	.006667	.000967	.....	.....	
15,200	76,000	.009000	.002333	.....	.....	
16,000	80,000	.010900	.001900	.....	.....	
16,800	84,000	.013333	.002433	.....	.....	
17,600	88,000	.015667	.002334	.....	.....	
18,400	92,000	.018033	.002366	.....	.....	
19,200	96,000	.021100	.003067	.....	.....	
20,000	100,000	.024000	.002900	.....	.....	
25,620	128,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	128,100
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	.1433
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		".06 from neck
Character of broken surface		fine silky
Elongation of inch sections		".07, ".16, ".20*

No. 6377.

Marks, A B_1
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000188	.000188	0.	.....	
2,000	10,000	.000800	.000167	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002033	.000366	.....	.....	
14,000	70,000	.002367	.000334	.....	.....	
14,200	71,000	.002433	.000366	.....	.....	
14,400	72,000	.002500	.000067	.....	.....	Elastic limit.
14,600	73,000	.014333	.011833	.....	.....	
14,800	74,000	.015000	.000667	.....	.....	
15,000	75,000	.015700	.000700	.....	.....	
15,200	76,000	.016667	.000967	.....	.....	
15,600	78,000	.018333	.001666	.....	.....	
16,000	80,000	.020167	.001834	.....	.....	
16,800	84,000	.024000	.003833	.....	.....	
17,600	88,000	.028333	.004333	.....	.....	
18,400	92,000	.033067	.004734	.....	.....	
19,200	96,000	.038333	.005266	.....	.....	
20,000	100,000	.045333	.007000	.....	.....	
22,700	113,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	113,500
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.002500
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.55 from neck
Character of broken surface		fine silky, with trace of granulation
Elongation of inch sections		″.14, ″.31*, ″.13

No. 6378.

Marks A B,
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000800	.000167	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001667	.000367	0.	.....	
12,000	60,000	.002033	.000366	.....	.....	
14,000	70,000	.002400	.000367	.....	.....	
14,200	71,000	.002467	.000067	.....	.....	
14,400	72,000	.002533	.000066	.....	.....	
14,600	73,000	.002600	.000067	.....	.....	
14,800	74,000	.002633	.000033	.....	.....	Elastic limit.
15,000	75,000	.012333	.009700	.....	.....	
15,200	76,000	.012933	.000600	.....	.....	
15,600	78,000	.014000	.001067	.....	.....	
16,000	80,000	.015667	.001667	.....	.....	
16,800	84,000	.019000	.003333	.....	.....	
17,600	88,000	.022733	.003733	.....	.....	
18,400	92,000	.026333	.003600	.....	.....	
19,200	96,000	.030667	.004334	.....	.....	
20,000	100,000	.035333	.004666	.....	.....	
20,800	104,000	.040167	.004834	.....	.....	
21,600	108,000	.047333	.007166	.....	.....	
23,890	119,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	119,450
Elastic limit per square inch of original section	do...	74,000
Elongation per inch after rupture	inch..	.1733
Elongation per inch under strain at elastic limit	do...	.002633
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1" from neck
Character of broken surface		fine, silky, trace of granulation
Elongation of inch sections		".25*, ".16, ".11

No. 6379.

Marks, A G_1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.		
2,000	10,000	.000300	.000167			
4,000	20,000	.000333	.000333			
6,000	30,000	.000667	.000334			
8,000	40,000	.001000	.000333			
10,000	50,000	.001333	.000333	0.		
12,000	60,000	.002000	.000667			
14,000	70,000	.002667	.000667			
14,200	71,000	.002833	.000166			
14,400	72,000	.002500	.000667			
14,600	73,000	.014500	.012000			Elastic limit.
14,800	74,000	.015500	.001000			
15,000	75,000	.016000	.000500			
15,200	76,000	.016900	.000900			
15,600	78,000	.018333	.001433			
16,000	80,000	.020500	.002167			
16,800	84,000	.024167	.003667			
17,600	88,000	.028167	.004000			
18,400	92,000	.033667	.005500			
19,200	96,000	.039667	.006000			
20,000	100,000	.046667	.007000			
22,490	112,450					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,450
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002500
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1".6 from neck
Character of broken surface		fine silky, trace of granulation
Elongation of inch sections		".12, ".84, ".14

No. 6380.

Marks, A G 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000900	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002033	.000366	.....	.....	
14,000	70,000	.002367	.000334	.....	.....	
14,200	71,000	.002433	.000066	.....	.....	
14,400	72,000	.002500	.000067	.....	.....	
14,600	73,000	.002533	.000033	.....	.....	
14,800	74,000	.002567	.000034	.....	.....	
15,000	75,000	.002633	.000066	.....	.....	
15,200	76,000	.002667	.000034	.....	.....	
15,400	77,000	.002700	.000033	.....	.....	Elastic limit.
		.005667	.002967	.....	.....	
15,600	78,000	.008333	.002666	.....	.....	
15,800	79,000	.008700	.000867	.....	.....	
16,000	80,000	.009867	.000667	.....	.....	
16,400	82,000	.010400	.001033	.....	.....	
16,800	84,000	.012000	.001600	.....	.....	
17,600	88,000	.015000	.003000	.....	.....	
18,400	92,000	.017667	.002667	.....	.....	
19,200	96,000	.020500	.002833	.....	.....	
20,000	100,000	.023333	.002833	.....	.....	
20,800	104,000	.027000	.003667	.....	.....	
21,600	108,000	.031333	.004333	.....	.....	
22,400	112,000	.038500	.007167	.....	.....	
23,200	116,000	.041000	.002500	.....	.....	
26,020	130,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	130,100
Elastic limit per square inch of original section	do...	77,000
Elongation per inch after rupture	inch..	.1433
Elongation per inch under strain at elastic limit	do...	.002700
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		1".08 from neck
Character of broken surface		fine silky, interspersed with granular metal
Elongation of inch sections		".20*, ".14, ".09

No. 6381.

Marks A B 1, R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	5.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000800	.000167	.....	.....	
4,000	20,000	.000633	.000833	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002033	.000366	.....	.....	
13,000	65,000	.002267	.000234	.....	.....	Elastic limit.
13,200	66,000	.014333	.012066	.....	.....	
13,400	67,000	.015267	.000934	.....	.....	
13,600	68,000	.016167	.000900	.....	.....	
14,000	70,000	.018400	.002233	.....	.....	
14,400	72,000	.019500	.001100	.....	.....	
15,200	76,000	.022333	.003833	.....	.....	
16,000	80,000	.028667	.006334	.....	.....	
16,800	84,000	.033433	.004766	.....	.....	
17,600	88,000	.038333	.004900	.....	.....	
18,400	92,000	.045000	.006667	.....	.....	
19,200	96,000	.054667	.009667	.....	.....	
21,190	105,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,950
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002267
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		1".06 from neck
Character of broken surface		fine silky, trace of granulation
Elongation of inch sections		".12, ".19, ".29*

No. 6382.

Marks, A B 2, R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
12,800	64,000	.002167	.000167	.....	.....	
13,000	65,000	.002200	.000033	.....	.....	
13,200	66,000	.002233	.000033	.....	.....	Elastic limit.
13,400	67,000	.012333	.010100	.....	.....	
13,600	68,000	.013300	.000967	.....	.....	
13,800	69,000	.013733	.000433	.....	.....	
14,000	70,000	.014333	.000600	.....	.....	
14,400	72,000	.015667	.001334	.....	.....	
15,200	76,000	.018667	.003000	.....	.....	
16,000	80,000	.022667	.004000	.....	.....	
16,800	84,000	.027000	.004333	.....	.....	
17,600	88,000	.031467	.004167	.....	.....	
18,400	92,000	.036000	.004533	.....	.....	
19,200	96,000	.041833	.005833	.....	.....	
20,000	100,000	.050333	.008500	.....	.....	
22,250	111,250	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	111,250
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	.1533
Elongation per inch under strain at elastic limit	do...	.002233
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		".60 from neck
Character of broken surface		fine silky, trace of granulation
Elongation of inch sections		".25", ".11, ".10

No. 6383.

Marks, A G_1, R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000833	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001833	.000833	.....	.....	
10,000	50,000	.001667	.000834	0.	.....	
12,000	60,000	.002033	.000366	.....	.....	
12,200	61,000	.002100	.000067	.....	.....	Elastic limit.
12,400	62,000	.010333	.008233	.....	.....	
12,600	63,000	.011233	.000900	.....	.....	
12,800	64,000	.011667	.000434	.....	.....	
13,200	66,000	.013333	.001666	.....	.....	
13,600	68,000	.014667	.001334	.....	.....	
14,400	72,000	.018500	.003833	.....	.....	
15,200	76,000	.022000	.003500	.....	.....	
16,000	80,000	.025767	.003767	.....	.....	
16,800	84,000	.031000	.005233	.....	.....	
17,600	88,000	.036167	.005167	.....	.....	
18,400	92,000	.043000	.006833	.....	.....	
19,200	96,000	.056667	.013667	.....	.....	
21,480	107,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	107,400
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".5 from neck
Character of broken surface		fine silky
Elongation of inch sections		".12, ".32*, ".16

No. 6384.

Marks, A G_2, R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.001333	.....	.....	
13,600	68,000	.002300	.000300	.....	.....	
13,800	69,000	.002333	.000033	.....	.....	Elastic limit.
14,000	70,000	.009000	.006667	.....	.....	
14,200	71,000	.009567	.000567	.....	.....	
14,400	72,000	.010267	.000700	.....	.....	
14,800	74,000	.011333	.001166	.....	.....	
15,600	78,000	.014167	.002834	.....	.....	
16,400	82,000	.017167	.003000	.....	.....	
17,200	86,000	.019833	.002666	.....	.....	
18,000	90,000	.023000	.003167	.....	.....	
18,800	94,000	.026667	.003667	.....	.....	
19,200	96,000	.028500	.001833	.....	.....	
20,000	100,000	.033667	.005167	.....	.....	
20,800	104,000	.037333	.003666	.....	.....	
21,600	108,000	.043333	.006000	.....	.....	
22,400	112,000	.051333	.008000	.....	.....	
24,270	121,350	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	121,350
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.1467
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		at middle of the stem
Character of broken surface		fine granular
Elongation of inch sections		".10, ".28*, ".11

No. 6385.

Hollow specimen.
Marks, J X.
Exterior diameter, ".588.
Interior diameter, ".300.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000833	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001633	.000333	0.	.....	
11,000	55,000	.001800	.000167	.....	.....	
11,200	56,000	.001867	.000067	.....	.....	
11,400	57,000	.001900	.000033	.....	.....	
11,600	58,000	.001967	.000067	.....	.....	
11,800	59,000	.002033	.000066	.....	.....	Elastic limit.
12,000	60,000	.003967	.001934	.....	.....	
12,200	61,000	.004400	.000433	.....	.....	
12,400	62,000	.004700	.000300	.....	.....	
12,600	63,000	.005100	.000400	.....	.....	
12,800	64,000	.005667	.000567	.....	.....	
13,200	66,000	.006367	.000700	.....	.....	
13,600	68,000	.007300	.000933	.....	.....	
14,400	72,000	.009167	.001867	.....	.....	
15,200	76,000	.011400	.002233	.....	.....	
16,000	80,000	.013333	.001933	.....	.....	
16,800	84,000	.015667	.002334	.....	.....	
17,600	88,000	.018167	.002500	.....	.....	
18,400	92,000	.020833	.002666	.....	.....	
19,200	96,000	.023500	.002667	.....	.....	
20,000	100,000	.026667	.003167	.....	.....	
20,800	104,000	.030000	.003333	.....	.....	
21,600	108,000	.034333	.004333	.....	.....	
22,400	112,000	.039333	.005000	.....	.....	
23,200	116,000	.045333	.006000	.....	.....	
25,280	126,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	126,400
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.1233
Elongation per inch under strain at elastic limit	do...	.002033
Reduction in diameter at point of rupture (exterior)	do...	.068
Position of rupture		".8 from neck
Character of broken surface		fine, granular
Elongation of inch sections		".09, ".11, ".17*

Open Hearth Stock, Lime Annealed in Furnace after Cooling from Rolling Heat.

No. 6390.

Marks, L B from breech.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.000967	.000367	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001667	.000367	0.	.....	
10,400	52,000	.001767	.000100	.....	.....	
10,600	53,000	.001800	.000033	.....	.....	
10,800	54,000	.001867	.000067	.....	.....	Elastic limit.
11,000	55,000	.004867	.003000	.....	.....	
11,200	56,000	.006033	.001166	.....	.....	
11,400	57,000	.006567	.000534	.....	.....	
11,600	58,000	.006933	.000366	.....	.....	
12,000	60,000	.008100	.001167	.....	.....	
12,400	62,000	.009333	.001233	.....	.....	
12,800	64,000	.010667	.001334	.....	.....	
13,600	68,000	.013333	.002666	.....	.....	
14,400	72,000	.016000	.002667	.....	.....	
15,200	76,000	.019033	.003033	.....	.....	
16,000	80,000	.022333	.003300	.....	.....	
16,800	84,000	.026000	.003667	.....	.....	
17,600	88,000	.030400	.004400	.....	.....	
18,400	92,000	.036000	.005600	.....	.....	
19,200	96,000	.042733	.006733	.....	.....	
20,000	100,000	.051000	.008267	.....	.....	
22,010	110,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,050
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.001867
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		".7 from neck
Character of broken surface		fine, silky
Elongation of inch sections		",10, ",10, ".35"

No. 6891.

Marks, L. M. from muzzle.
Diameter, ".505.
Sectional area, .20 square inch.
Guaged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000667	.000667	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
11,000	55,000	.001900	.000233	.....	.....	
12,000	60,000	.002033	.000133	.....	.....	
12,200	61,000	.002067	.000034	.....	.....	Elastic limit.
12,400	62,000	.005267	.003200	.....	.....	
12,600	63,000	.005567	.000300	.....	.....	
12,800	64,000	.006100	.000533	.....	.....	
13,200	66,000	.007333	.001233	.....	.....	
13,600	68,000	.008167	.000834	.....	.....	
14,400	72,000	.011100	.002933	.....	.....	
15,200	76,000	.013000	.001900	.....	.....	
16,000	80,000	.015667	.002667	.....	.....	
16,800	84,000	.018500	.002833	.....	.....	
17,600	88,000	.021333	.002833	.....	.....	
18,400	92,000	.024667	.003334	.....	.....	
19,200	96,000	.028000	.003333	.....	.....	
20,000	100,000	.032167	.004167	.....	.....	
20,800	104,000	.036667	.004500	.....	.....	
21,600	108,000	.043000	.006333	.....	.....	
23,940	119,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	119,700
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002067
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".18 from neck
Character of broken surface		silky, trace of fine granulation; partial fracture of stem at center punch mark, defining inch sections on surface of stem.
Elongation of inch sections		".18*, ".27*, ".11

Rolled Barrel Steel.

No. 6397.

Marks, S X M from muzzle.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000683	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001667	.000367	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002333	.000333	.....	.....	
14,200	71,000	.002367	.000034	.....	.....	Elastic limit.
14,400	72,000	.013533	.011166	.....	.....	
14,600	73,000	.014000	.000467	.....	.....	
14,800	74,000	.014667	.000667	.....	.....	
15,000	75,000	.015333	.000666	.....	.....	
15,200	76,000	.016267	.000934	.....	.....	
15,600	78,000	.017667	.001400	.....	.....	
16,000	80,000	.019333	.001666	.....	.....	
16,800	84,000	.022933	.003600	.....	.....	
17,600	88,000	.027333	.004400	.....	.....	
18,400	92,000	.031500	.004167	.....	.....	
19,200	96,000	.036333	.004833	.....	.....	
20,000	100,000	.043333	.007000	.....	.....	
22,910	114,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	114,550
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002367
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".21 from neck
Character of broken surface		fine silky
Elongation of inch sections		".13, ".22*, ".21*

No. 6398.

Marks, S X B, from breech.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
13,000	65,000	.002233	.000233	.....	.....	
13,200	66,000	.002267	.000034	.....	.....	
13,400	67,000	.002300	.000033	.....	.....	Elastic limit.
13,600	68,000	.015367	.013067	.....	.....	
13,800	69,000	.016667	.001300	.....	.....	
14,000	70,000	.017267	.000600	.....	.....	
14,400	72,000	.018333	.001066	.....	.....	
14,800	74,000	.019667	.001334	.....	.....	
15,200	76,000	.021667	.002000	.....	.....	
16,000	80,000	.025000	.004333	.....	.....	
16,800	84,000	.029767	.008767	.....	.....	
17,600	88,000	.034667	.004900	.....	.....	
18,400	92,000	.040000	.005333	.....	.....	
19,200	96,000	.047667	.007667	.....	.....	
20,000	100,000	.058333	.010666	.....	.....	
22,030	110,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,150
Elastic limit per square inch of original section	do...	67,000
Elongation per inch after rupture	inch..	.1833
Elongation per inch under strain at elastic limit	do...	.002300
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".5 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".14, ".30*, ".11

No. 6399.

Marks, S.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001633	.000333	0.	.....	
12,000	60,000	.001967	.000334	.....	.....	
14,000	70,000	.002333	.000366	.....	.....	
14,200	71,000	.002367	.000034	.....	.....	
14,400	72,000	.002400	.000033	.....	.....	Elastic limit.
14,600	73,000	.005500	.003100	.....	.....	
14,800	74,000	.005967	.000467	.....	.....	
15,000	75,000	.006600	.000633	.....	.....	
15,200	76,000	.007000	.000400	.....	.....	
15,600	78,000	.008067	.001067	.....	.....	
16,000	80,000	.009100	.001033	.....	.....	
16,800	84,000	.011333	.002233	.....	.....	
17,600	88,000	.013667	.002334	.....	.....	
18,400	92,000	.016333	.002666	.....	.....	
19,200	96,000	.019033	.002700	.....	.....	
20,000	100,000	.021600	.002567	.....	.....	
20,800	104,000	.024833	.003233	.....	.....	
21,600	108,000	.028233	.003400	.....	.....	
22,400	112,000	.032000	.003767	.....	.....	
23,200	116,000	.036500	.004500	.....	.....	
24,000	120,000	.043000	.006500	.....	.....	
26,310	131,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	131,550
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.1533
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		1".04 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".09, ".13, ".24*

SAME METAL AS No. 6399, ALLOWED TO COOL PARTLY AFTER ROLLING, THEN REHEATED AND ANNEALED IN CHARCOAL.

No. 6409.

Marks, S. R. B. from breech.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000867	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
13,000	65,000	.002200	.000200	.....	.....	
13,600	68,000	.002300	.000100	.....	.....	Elastic limit.
13,800	69,000	.005600	.003300	.....	.....	
14,000	70,000	.006333	.000733	.....	.....	
14,200	71,000	.009200	.002867	.....	.....	
14,400	72,000	.009733	.000533	.....	.....	
14,800	74,000	.011000	.001267	.....	.....	
15,200	76,000	.011767	.000767	.....	.....	
16,000	80,000	.014233	.002466	.....	.....	
16,800	84,000	.017000	.002767	.....	.....	
17,600	88,000	.019667	.002667	.....	.....	
18,400	92,000	.022500	.002833	.....	.....	
19,200	96,000	.025600	.003100	.....	.....	
20,000	100,000	.029333	.003733	.....	.....	
20,800	104,000	.032833	.003500	.....	.....	
21,600	108,000	.037733	.004900	.....	.....	
22,400	112,000	.044333	.006600	.....	.....	
24,890	124,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	124,450
Elastic limit per square inch of original section	do...	68,000
Elongation per inch after rupture	inch..	.1667
Elongation per inch under strain at elastic limit	do...	.002300
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		".7 from neck
Character of broken surface		fine, silky, serrated
Elongation of inch sections		".10, ".07, ".33*

No. 6410.

Marks, S. R. M. from muzzle.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002033	.000333	.....	.....	
13,000	65,000	.002233	.000200	.....	.....	
14,000	70,000	.002400	.000167	.....	.....	Elastic limit.
		.008933	.006533	.....	.....	
14,200	71,000	.009100	.000167	.....	.....	
14,400	72,000	.009633	.000533	.....	.....	
14,800	74,000	.011000	.001367	.....	.....	
15,200	76,000	.011933	.000933	.....	.....	
16,000	80,000	.014233	.002300	.....	.....	
16,800	84,000	.016667	.002434	.....	.....	
17,600	88,000	.019333	.002666	.....	.....	
18,400	92,000	.021833	.002500	.....	.....	
19,200	96,000	.025000	.003167	.....	.....	
20,000	100,000	.028000	.003000	.....	.....	
20,800	104,000	.031667	.003667	.....	.....	
21,600	108,000	.036333	.004666	.....	.....	
22,400	112,000	.041333	.005000	.....	.....	
25,280	126,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	126,400
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		".85 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".80", ".10, ".07

No. 6400.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000800	.000167	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000867	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000867	0.	.....	
12,000	60,000	.002033	.000333	.....	.....	
14,000	70,000	.002400	.000867	.....	.....	
15,400	77,000	.002700	.000300	.....	.....	
15,600	78,000	.002767	.000067	.....	.....	Elastic limit.
15,800	79,000	.007667	.004900	.....	.....	
16,000	80,000	.008333	.000666	.....	.....	
16,200	81,000	.008767	.000434	.....	.....	
16,400	82,000	.009600	.000833	.....	.....	
16,800	84,000	.010400	.000800	.....	.....	
17,600	88,000	.013067	.002667	.....	.....	
18,400	92,000	.015267	.002200	.....	.....	
19,200	96,000	.018333	.003066	.....	.....	
20,000	100,000	.020667	.002334	.....	.....	
20,800	104,000	.023333	.002666	.....	.....	
21,600	108,000	.026333	.003000	.....	.....	
22,400	112,000	.030333	.004000	.....	.....	
23,200	116,000	.034333	.004000	.....	.....	
24,000	120,000	.039000	.004667	.....	.....	
26,910	134,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	134,550
Elastic limit per square inch of original section	do....	78,000
Elongation per inch after rupture	inch..	.1583
Elongation per inch under strain at elastic limit	do....	.002767
Reduction in diameter at point of rupture	do....	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1″.5 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.10, ″.26*, ″.10

Specimens from Bar as Received.

No. 6405.

Marks, 80 E, from end of bar.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
11,600	58,000	.001967	.000267	.....	.....	
11,800	59,000	.002000	.000033	.....	.....	Elastic limit.
12,000	60,000	.002200	.000200	.....	.....	
12,200	61,000	.004000	.001800	.....	.....	
12,400	62,000	.004400	.000400	.....	.....	
12,600	63,000	.004967	.000567	.....	.....	
12,800	64,000	.005367	.000400	.....	.....	
13,200	66,000	.006667	.001300	.....	.....	
13,600	68,000	.007767	.001100	.....	.....	
14,400	72,000	.010000	.002233	.....	.....	
15,200	76,000	.012333	.002333	.....	.....	
16,000	80,000	.015000	.002667	.....	.....	
16,800	84,000	.017667	.002667	.....	.....	
17,600	88,000	.020733	.003066	.....	.....	
18,400	92,000	.023667	.002934	.....	.....	
19,200	96,000	.027167	.003500	.....	.....	
20,000	100,000	.031333	.004166	.....	.....	
20,800	104,000	.036333	.005000	.....	.....	
21,600	108,000	.043333	.007000	.....	.....	
22,400	112,000	.050333	.007000	.....	.....	
24,020	120,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	120,100
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.1667
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		at middle of stem
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".12, ".27", ".11

No. 6406.

Marks, 80 M, from middle of bar.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	.....	.....	
11,000	55,000	.001900	.000200	.....	.....	
11,600	58,000	.002000	.000100	.....	.....	
11,800	59,000	.002033	.000033	.....	.....	Elastic limit
12,000	60,000	.002300	.000267	.....	.....	
12,200	61,000	.004100	.001800	.....	.....	
12,400	62,000	.004467	.000367	.....	.....	
12,800	64,000	.005567	.001100	.....	.....	
13,200	66,000	.006767	.001200	.....	.....	
13,600	68,000	.007667	.000900	.....	.....	
14,400	72,000	.010167	.002500	.....	.....	
15,200	76,000	.012333	.002166	.....	.....	
16,000	80,000	.015000	.002667	.....	.....	
16,800	84,000	.017667	.002667	.....	.....	
17,600	88,000	.020400	.002733	.....	.....	
18,400	92,000	.023933	.003533	.....	.....	
19,200	96,000	.027333	.003400	.....	.....	
20,000	100,000	.032000	.004667	.....	.....	
20,800	104,000	.036667	.004667	.....	.....	
21,600	108,000	.042833	.006166	.....	.....	
22,400	112,000	.051000	.008167	.....	.....	
24,030	120,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	120,150
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.002033
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		at middle of stem
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".12, ".24*, ".11

Specimens from Barrel Rolled and Annealed in Charcoal.

No. 6407.

Marks, 80 R B, breech end.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	.000067	.000067	Elastic limit.
10,200	51,000	.003667	.001967	.....	.....	
10,400	52,000	.005500	.001833	.....	.....	
10,600	53,000	.006067	.000567	.....	.....	
10,800	54,000	.006633	.000566	.....	.....	
11,200	56,000	.007667	.001034	.....	.....	
11,600	58,000	.008833	.001166	.....	.....	
12,000	60,000	.010333	.001500	.....	.....	
12,800	64,000	.012667	.002334	.....	.....	
13,600	68,000	.015367	.002700	.....	.....	
14,400	72,000	.017667	.002300	.....	.....	
15,200	76,000	.020833	.003166	.....	.....	
16,000	80,000	.024400	.003567	.....	.....	
16,800	84,000	.028333	.003933	.....	.....	
17,600	88,000	.033000	.004667	.....	.....	
18,400	92,000	.038000	.005000	.....	.....	
19,200	96,000	.044667	.006667	.....	.....	
20,000	100,000	.054000	.009333	.....	.....	
21,710	108,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,550
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		1 "from neck
Character of broken surface		silky, interspersed with granular metal at the circumference.
Elongation of inch sections		".22*, ".15, ".10

No. 6408.

Marks, 80 R. M. muzzle end.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	.....	.....	
11,000	55,000	.001867	.000200	.....	.....	
11,200	56,000	.001900	.000033	.....	.....	
11,400	57,000	.001967	.000067	.....	.....	Elastic limit.
11,600	58,000	.007500	.005533	.....	.....	
11,800	59,000	.008200	.000700	.....	.....	
12,000	60,000	.008600	.000400	.....	.....	
12,400	62,000	.009667	.001067	.....	.....	
12,800	64,000	.010733	.001066	.....	.....	
13,600	68,000	.013333	.002600	.....	.....	
14,400	72,000	.016233	.002900	.....	.....	
15,200	76,000	.019167	.002934	.....	.....	
16,000	80,000	.022100	.002933	.....	.....	
16,800	84,000	.025333	.003233	.....	.....	
17,600	88,000	.029167	.003834	.....	.....	
18,400	92,000	.033333	.004166	.....	.....	
19,200	96,000	.038667	.005334	.....	.....	
20,000	100,000	.046333	.007666	.....	.....	
22,570	112,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,850
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.001967
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1".5 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".15, ".30*, ".12

No. 6411.

From end of bar as received.
Marks, S. E.
Diameter, ".505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
14,000	70,000	.002367	.000367	.....	.....	
15,000	75,000	.002600	.000233	.....	.....	Elastic limit.
15,200	76,000	.004167	.001567	.....	.....	
15,400	77,000	.005100	.000933	.....	.....	
15,600	78,000	.006000	.000900	.....	.....	
16,000	80,000	.006500	.000500	.....	.....	
16,800	84,000	.008833	.002333	.....	.....	
17,600	88,000	.010500	.001667	.....	.....	
18,400	92,000	.012833	.002333	.....	.....	
19,200	96,000	.015000	.002167	.....	.....	
20,000	100,000	.017333	.002333	.....	.....	
20,800	104,000	.020133	.002800	.....	.....	
21,600	108,000	.022500	.002367	.....	.....	
22,400	112,000	.025667	.003167	.....	.....	
23,200	116,000	.029167	.003500	.....	.....	
24,000	120,000	.033333	.004166	.....	.....	
27,620	138,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	138,100
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1533
Elongation per inch under strain at elastic limit	do...	.002600
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".25 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".08, ".23*, ".15

No. 6412.

From middle of bar as received.
Marks, S M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000667	.000367	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002033	.000366	.....	.....	
14,000	70,000	.002367	.000334	.....	.....	
14,800	74,000	.002533	.000166	.....	.....	Elastic limit.
15,000	75,000	.002700	.000167	.....	.....	
15,200	76,000	.005033	.002333	.....	.....	
15,400	77,000	.005433	.000400	.....	.....	
15,600	78,000	.006033	.000600	.....	.....	
16,000	80,000	.006767	.000734	.....	.....	
16,800	84,000	.009100	.002333	.....	.....	
17,600	88,000	.011000	.001900	.....	.....	
18,400	92,000	.013067	.002067	.....	.....	
19,200	96,000	.015700	.002633	.....	.....	
20,000	100,000	.017967	.002267	.....	.....	
20,800	104,000	.020833	.002866	.....	.....	
21,600	108,000	.023333	.002500	.....	.....	
22,400	112,000	.026667	.003334	.....	.....	
23,200	116,000	.030100	.003433	.....	.....	
24,000	120,000	.034333	.004233	.....	.....	
27,510	137,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	137,550
Elastic limit, per square inch of original section	do...	74,000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.002533
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.8
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".10, ".28*, ".09

No. 6413.

From end of bar.
Marks, S_1 E.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002067	.000367	.....	.....	
13,400	67,000	.002333	.000266	.....	.....	
13,600	68,000	.002367	.000034	.....	.....	Elastic limit.
13,800	69,000	.004667	.002300	.....	.....	
14,000	70,000	.005333	.000666	.....	.....	
14,400	72,000	.005900	.000567	.....	.....	
15,200	76,000	.007600	.001700	.....	.....	
16,000	80,000	.010000	.002400	.....	.....	
18,800	84,000	.011767	.001767	.....	.....	
17,600	88,000	.014000	.002233	.....	.....	
18,400	92,000	.016400	.002400	.....	.....	
19,200	96,000	.019000	.002600	.....	.....	
20,000	100,000	.021233	.002233	.....	.....	
20,800	104,000	.024667	.003434	.....	.....	
21,600	108,000	.027500	.002833	.....	.....	
22,400	112,000	.031167	.003667	.....	.....	
23,200	116,000	.035000	.003833	.....	.....	
24,000	120,000	.040500	.005500	.....	.....	
26,620	133,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	133,100
Elastic limit per square inch of original section	do...	68,000
Elongation per inch after rupture	inch...	.1500
Elongation per inch under strain at elastic limit	do...	.002367
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1".3 from neck
Character of broken surface		fine silky, with trace of granulation
Elongation of inch sections		".13, ".23*, ".09

No. 6414.

From middle of bar.
Marks, S 1 M.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	.....	.....	
10,000	50,000	.001700	.000333	0.	.....	
12,000	60,000	.002067	.000367	.....	.....	
13,600	68,000	.002300	.000233	.....	.....	
13,800	69,000	.002333	.000033	.....	.....	Elastic limit.
14,000	70,000	.004400	.002067	.....	.....	
14,200	71,000	.004900	.000500	.....	.....	
14,400	72,000	.005067	.000167	.....	.....	
14,800	74,000	.005867	.000800	.....	.....	
15,200	76,000	.007000	.001133	.....	.....	
16,000	80,000	.009333	.002333	.....	.....	
16,800	84,000	.011000	.001667	.....	.....	
17,600	88,000	.013067	.002067	.....	.....	
18,400	92,000	.015333	.002266	.....	.....	
19,200	96,000	.018000	.002667	.....	.....	
20,000	100,000	.020500	.002500	.....	.....	
20,800	104,000	.022833	.002333	.....	.....	
21,600	108,000	.026433	.003600	.....	.....	
22,400	112,000	.029333	.002900	.....	.....	
23,200	116,000	.033667	.004334	.....	.....	
24,000	120,000	.038667	.005000	.....	.....	
26,860	134,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	134,300
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1".16 from neck
Character of broken surface		fine silky, with trace of granulation
Elongation of inch sections		".09, ".19* ".17*

RED-END BARS.

No. 6417.

From bar as received.
Marks, 81 R.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	0.	.....	
12,000	60,000	.002067	.000367	.....	.....	
13,000	65,000	.002267	.000200	.....	.....	
13,200	66,000	.002300	.000033	.....	.....	Elastic limit.
		.006667	.004367	.....	.....	
13,400	67,000	.007333	.000666	.....	.....	
13,600	68,000	.007933	.000600	.....	.....	
14,000	70,000	.009000	.001067	.....	.....	
14,400	72,000	.010067	.001067	.....	.....	
15,200	76,000	.013033	.002967	.....	.....	
16,000	80,000	.015700	.002667	.....	.....	
16,800	84,000	.018667	.002967	.....	.....	
17,600	88,000	.021700	.003033	.....	.....	
18,400	92,000	.025367	.003667	.....	.....	
19,200	96,000	.029333	.003966	.....	.....	
20,000	100,000	.033733	.004400	.....	.....	
20,800	104,000	.038500	.004767	.....	.....	
21,600	108,000	.045667	.007167	.....	.....	
22,400	112,000	.054333	.008666	.....	.....	
23,810	119,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	119,050
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	.1833
Elongation per inch under strain at elastic limit	do...	.002300
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section	do...	46.2
Position of rupture		1″.35 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.17, ″.28*, ″.10

RED-END BAR.

No. 6418.

From breech end of barrel, rolled and annealed.
Marks, 81 R R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001333	.000333	.....	.....	
10,000	50,000	.001700	.000367	.....	.....	
11,000	55,000	.001833	.000133	.....	.....	
11,200	56,000	.001867	.000034	.....	.....	Elastic limit.
11,400	57,000	.006000	.004133	.....	.....	
11,600	58,000	.008267	.002267	.....	.....	
11,800	59,000	.010400	.002133	.....	.....	
12,000	60,000	.011333	.000933	.....	.....	
12,400	62,000	.012333	.001000	.....	.....	
12,800	64,000	.013900	.001567	.....	.....	
13,600	68,000	.017400	.003500	.....	.....	
14,400	72,000	.020333	.002933	.....	.....	
15,200	76,000	.023667	.003334	.....	.....	
16,000	80,000	.027500	.003833	.....	.....	
16,800	84,000	.032500	.005000	.....	.....	
17,600	88,000	.038333	.005833	.....	.....	
18,400	92,000	.045000	.006667	.....	.....	
19,200	96,000	.054333	.009333	.....	.....	
20,910	104,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,550
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.001867
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".12, ".33* ".12

GREEN-END BARS.

No. 6419.

From bar as received.
Marks, 81 G.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001333	.000366	.....	.....	
10,000	50,000	.001667	.000334	0.	.....	
12,000	60,000	.002000	.000333	.....	.....	
13,400	67,000	.002233	.000233	.....	.....	
13,600	68,000	.002267	.000034	.....	.....	Elastic limit.
		.012000	.009733	.....	.....	
13,800	69,000	.012567	.000567	.....	.....	
14,000	70,000	.013333	.000766	.....	.....	
14,400	72,000	.014333	.001000	.....	.....	
14,800	74,000	.016267	.001934	.....	.....	
15,200	76,000	.018333	.002066	.....	.....	
16,000	80,000	.021500	.003167	.....	.....	
16,800	84,000	.025167	.003667	.....	.....	
17,600	88,000	.030000	.004833	.....	.....	
18,400	92,000	.034333	.004333	.....	.....	
19,200	96,000	.040667	.006334	.....	.....	
20,000	100,000	.048000	.007333	.....	.....	
20,800	104,000	.056667	.008667	.....	.....	
22,300	111,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	111,500
Elastic limit per square inch of original section	do...	68,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002267
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		″.13, ″.32*, ″.12

GREEN-END BAR.

No. 6420.

From breech end of barrel rolled and annealed.
Marks, 81 R G.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	.....	.....	
8,000	40,000	.001300	.000333	.....	.....	
10,000	50,000	.001667	.000367	.....	.....	
11,600	58,000	.001933	.000266	.....	.....	
11,800	59,000	.001967	.000034	.....	.....	Elastic limit.
12,000	60,000	.014667	.012700	.....	.....	
12,200	61,000	.015500	.000833	.....	.....	
12,400	62,000	.016500	.001000	.....	.....	
12,800	64,000	.018667	.002167	.....	.....	
13,600	68,000	.025833	.007166	.....	.....	
14,400	72,000	.026667	.000834	.....	.....	
15,200	76,000	.031500	.004833	.....	.....	
16,000	80,000	.037333	.005833	.....	.....	
16,800	84,000	.044333	.007000	.....	.....	
17,600	88,000	.054000	.009667	.....	.....	
19,710	98,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98,550
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.2167
Elongation per inch under strain at elastic limit	do...	.001967
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.7 from neck
Character of broken surface		fine, silky
Elongation of inch section		″.16, ″.35*, ″.14

From Rolled Barrel, Reheated in New Annealing Furnace and Annealed in Charcoal.

No. 6438.

Marks, S 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000033	.000033	0.	.....	
2,000	10,000	.000267	.000234	.....	.....	
4,000	20,000	.000600	.000333	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001167	.000167	.....	.....	
8,000	40,000	.001333	.000166	.....	.....	
8,800	44,000	.....	.....	.....	.....	Elastic limit, approximate.
9,000	45,000	.001667	.000334	.000100	.000100	
9,200	46,000	.001800	.000133	.....	.....	
9,400	47,000	.002067	.000267	.....	.....	
9,600	48,000	.003467	.001400	.....	.....	
9,800	49,000	.004000	.000533	.....	.....	
10,000	50,000	.004433	.000433	.....	.....	
10,200	51,000	.004733	.000300	.....	.....	
10,400	52,000	.005067	.000334	.....	.....	
10,600	53,000	.005500	.000433	.....	.....	
10,800	54,000	.006333	.000833	.....	.....	
11,000	55,000	.006800	.000467	.....	.....	
11,600	58,000	.008333	.001533	.....	.....	
12,000	60,000	.009333	.001000	.....	.....	
12,400	62,000	.010467	.001134	.....	.....	
12,800	64,000	.011333	.000866	.....	.....	
13,600	68,000	.013600	.002267	.....	.....	
14,400	72,000	.016433	.002833	.....	.....	
15,200	76,000	.018933	.002500	.....	.....	
16,000	80,000	.021667	.002734	.....	.....	
16,800	84,000	.025167	.003500	.....	.....	
17,600	88,000	.029000	.003833	.....	.....	
18,400	92,000	.030233	.001233	.....	.....	
19,200	96,000	.037100	.006867	.....	.....	
22,580	112,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,900
Elastic limit per square inch of original section (approximate)	do...	44,000
Elongation per inch after rupture	inch..	.1200
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".90 from neck
Character of broken surface		fine, granular
Elongation of inch sections		".16", ".12, ".08

TABULATION OF TENSION SPECIMENS FROM RIFLE-BARREL STEEL (LENGTH OF STEMS 8″).

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 8 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch section.	Remarks.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		″ ″ ″	
6016	A I M	.505	.20	71,000	118,100	17.8	37.1	Silky, interspersed with fine granulation, cup shaped.	.11, .29*, .12	
6017	A I M	.505	.20	75,000	117,400	19.0	40.3	....do	.12, .31*, .14	
6018	A I M	.505	.20	72,000	115,700	18.3	40.3	Fine silky, cup shaped	.12, .32*, .11	
6019	A I E	.505	.20	77,000	118,800	17.7	40.3	Silky, interspersed with fine granulation, cup shaped	.25*, .18, .10	
6020	A I E	.505	.20	72,000	117,900	17.7	37.1	....do	.12, .28*, .13	
6021	A I E	.505	.20	71,000	113,050	20.0	43.3	Fine silky, cup shaped	.14, .34*, .12	
6068	A	.505	.20	67,000	103,900	22.3	46.2	Fine silky	.25*, .29*, .13	
6069	A	.505	.20	69,000	114,050	17.7	43.3	....do	.30*, .13, .10	
6070	A	.505	.20	70,000	106,950	20.0	43.3	....do	.12, .34*, .14	
6096	78	.505	.20	75,000	123,050	15.0	30.7	Fine granular, radiating from the center	.10, .13, .22*	
6097	78 •	.505	.20	64,000	116,000	14.0	27.4	Silky, interspersed with fine granulation, radiating from the center.	.23*, .11, .08	From butt of barrels heated in new furnace and rolled.
6098	78 •	.505	.20	66,000	114,100	13.3	23.9	Silky, interspersed with fine granulation	.21*, .12, .07	From butt of barrels heated in new furnace and rolled.
6099	B ✪ R	.505	.20	101,000	125,500	16.3	34.0	Fine silky, cup shaped, serrated surface	.09, .19, .21*	
6100	B ✪ R	.505	.20	103,000	127,300	15.0	43.3	Fine silky, cup shaped	.07, .11, .27*	
6101	B ✪ R	.505	.20	103,000	126,350	15.0	37.1	....do	.09, .10, .26*	
6102	B ✪ W	.505	.20	87,000	111,050	18.7	46.2	....do	.29*, .16, .11	
6103	B ✪ W	.505	.20	87,000	112,550	17.3	40.3	....do	.10, .29*, .13	
6104	B ✪ W	.505	.20	86,000	112,550	17.7	30.7	....do	.11, .22*, .20*	
6123	79 E	.505	.20	69,000	115,300	20.0	51.9	Fine silky	.13, .35*, .12	End of bar before rolling.
6124	79 E B	.505	.20	64,000	104,000	18.3	37.1	....do	.12, .24*, .19	End of bar after rolling.
6125	79 M	.505	.20	68,000	115,050	19.0	46.2	....do	.16, .30*, .11	Middle of bar before rolling.
6126	79 M B	.505	.20	66,000	106,100	18.0	43.3	Silky	.10, .31*, .13	Middle of bar after rolling.
6155	A E 1	.505	.20	75,000	125,550	15.7	27.4	Silky, interspersed with fine granulation	.11, .24*, .12	
6156	A E 2	.505	.20	77,000	118,500	20.3	43.3	Fine silky	.13, .34*, .14	
6157	A M 1	.505	.20	76,000	117,100	19.3	46.2	....do	.14, .32*, .12	
6158	A M 2	.505	.20	75,000	124,550	14.0	16.9	Fine granular, radiating from the center	.14, .17*, .11	
6159	A R 1	.505	.20	72,000	112,000	18.7	40.3	Fine silky	.14, .31*, .11	
6160	A R 2	.505	.20	62,000	109,550	17.0	37.1	....do	.10, .13, .28*	
6262	78 B	.505	.20	71,000	133,550	15.0	43.3	....do	.14, .24*, .07	
6263	78 B R	.505	.20	60,000	123,200	15.7	34.0	Silky, interspersed with fine granulation	.13, .25*, .09	
6264	78 R	.505	.20	64,000	112,000	20.3	49.1	Fine silky	.13, .35*, .13	
6265	78 R R	.505	.20	58,000	104,350	20.3	46.2	....do	.14, .33*, .14	
6289	A I G	.505	.20	76,000	126,550	17.0	40.3	Fine silky, dark gray	.11, .28*, .12	
6290	A I R	.505	.20	69,000	104,600	22.3	51.9	....do	.13, .38*, .16	
6291	A I W	.505	.20	79,000	134,450	15.7	37.1	....do	.10, .26*, .11	
6292	78 B X	.505	.20	75,000	136,050	15.3	43.3	Silky, interspersed with fine granulation, cup shaped.	.20*, .17, .09	
6293	78 B R X	.505	.20	71,000	132,600	15.0	46.2	Fine silky, cup shaped	.27*, .11, .07	

TABULATION OF TENSION SPECIMENS FROM RIFLE-BARREL STEEL (LENGTH OF STEMS 8″)—Continued.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 8 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch section.	Remarks.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		″ ″ ″	
6294	78 B R*	.505	.20	74,000	130,500	16.3	49.1	Fine silky, cup shaped	.09, .30*, .10	
6306	A. I. B	.505	.20	73,000	122,550	18.3	49.1	....do	.11, .29*, .15	
6307	A I B. 1	.505	.20	81,000	139,450	14.7	34.0	Silky, interspersed with fine granulation, radiating from the center.	.10, .24*, .10	
6308	A I Y	.505	.20	67,000	99,500	24.0	54.6	Fine silky, cup shaped	.15, .41*, .16	
6309	A I R 1	.505	.20	69,000	105,450	22.0	54.6	....do	.13, .34*, .19	
6310	A I R R 1	.505	.20	65,000	102,100	21.7	51.9	Fine silky	.12, .33*, .20	
6311	A I R 2	.505	.20	72,000	113,000	19.7	43.3	Fine silky, cup shaped	.13, .33*, .13	
6312	A I R R 2	.505	.20	75,000	108,000	21.3	49.1	Fine silky	.29*, .23*, .12	
6313	A I R 3	.505	.20	69,000	102,800	23.7	54.6	Fine silky, cup shaped	.15, .40*, .16	
6314	A I R R 3	.505	.20	70,000	97,100	24.7	57.2	....do	.14, .39, .21	
6317	78 U	.505	.20	75,000	126,600	17.3	46.2	....do	.10, .30*, .12	
6318	78 U B	.505	.20	68,000	101,050	21.3	51.9	....do	.34*, .19, .11	
6337	S	.505	.20	70,000	132,050	16.0	43.3	Fine silky	.09, .29*, .10	
6338	C S	.505	.20	66,000	125,500	16.0	43.3	....do	.11, .27*, .10	
6339	S ✪	.505	.20	69,000	133,650	16.3	43.3	....do	.09, .28*, .12	
6340	S S ✪	.505	.20	70,000	133,550	14.7	43.3	....do	.23*, .14, .07	
6357	S C ✪	.505	.20	54,000	113,000	15.0	44.6	Silky, interspersed with fine granulation	.13, .23*, .11	Rolled barrel annealed in charcoal.
6369	S O	.588 / .296	.203	143,000	108,280	16.3	.....	Granular 85 per cent; silky 15 per cent	.11, .25*, .13	From butt of barrel after special treatment.
6373	S C L	.505	.20	56,000	113,950	16.0	34.0	Silky, interspersed with fine granulation	.09, .13, .26*	Rolled barrel, annealed in charcoal.
6374	S L	.505	.20	62,000	127,850	13.3	30.7	Silky center, fine granular at the circumference.	.08, .22*, .10	Rolled barrel, annealed in lime.
6375	S. S. S	.505	.20	65,000	128,100	14.3	40.3	Fine silky	.07, .16, .20*	Rolled barrel, annealed in sand.
6377	A B_1	.505	.20	72,000	113,500	19.3	43.3	Fine silky, with trace of granulation	.14, .31*, .13	
6378	A B_2	.505	.20	74,000	119,450	17.3	37.1	....do	.25*, .16, .11	
6379	A G_1	.505	.20	72,000	112,450	20.0	46.2	....do	.12, .34*, .14	
6380	A G_2	.505	.20	77,000	130,100	14.3	30.7	Fine silky, interspersed with granular metal	.20*, .14, .09	
6381	A B_1, R	.505	.20	65,000	105,950	20.0	43.3	Fine silky, trace of granulation	.12, .19, .29*	
6382	A B_2, R	.505	.20	66,000	111,250	15.3	34.0	....do	.25*, .11, .10	
6383	A G_1, R	.505	.20	61,000	107,400	20.0	43.3	Fine silky	.12, .32*, .16	
6384	A G_2, R	.505	.20	69,000	121,350	14.7	27.4	Fine granular	.10, .23*, .11	
6385	J X	.588 / .300	.20	59,000	126,400	12.3	.....	....do	.09, .11, .17*	
6390	L. B	.505	.20	54,000	110,050	17.7	49.1	Fine silky	.10, .10, .33*	Breech end: Open-hearth stock. Lime annealed in furnace after cooling from rolling heat.
6391	L. M	.505	.20	61,000	119,700	18.7	43.3	Silky, trace of fine granulation. Partial fracture of stem at center punch mark defining inch section on surface of stem.	.18, .27*, .11	Muzzle end: Open-hearth stock. Lime annealed in furnace after cooling from rolling heat.

6397	S X M	.505	.20	71,000	114,550	18.7	40.3	Fine silky	.13, .22*, .21	From muzzle / From breech: Rolled barrel steel.
6398	S X B	.505	.20	67,000	110,150	18.3	40.3	do	.14, .30*, .11	
6399	S	.505	.20	72,000	131,550	15.8	43.3	do	.09, .13, .24*	
6409	S R B	.505	.20	68,000	124,450	16.7	51.9	Fine silky, serrated	.10, .07, .33*	From breech: Same metal as No. 6399 allowed to cool partly after rolling, then reheated and annealed in charcoal.
6410	S R M	.505	.20	70,000	126,400	15.7	46.2	do	.30*, .10, .07	From muzzle: Same metal as No. 6399 allowed to cool partly after rolling, then reheated and annealed in charcoal.
6400	78	.505	.20	78,000	134,550	15.8	37.1	Fine silky	.10, .26*, .10	
6405	80 E	.505	.20	59,000	120,100	16.7	34.0	Silky, interspersed with granular metal at the circumference.	.12, .27*, .11	From end of bar / From middle of bar: From bar as received.
6406	80 M	.505	.20	59,000	120,150	15.7	30.7	do	.12, .24*, .11	
6407	80 R B	.505	.20	50,000	108,550	15.7	30.7	do	.22*, .15, .10	Breech end / Muzzle end: From barrel rolled and annealed in charcoal.
6408	80 R M	.505	.20	57,000	112,850	19.0	37.1	Fine silky	.15, .30*, .12	
6411	S E	.505	.20	75,000	138,100	15.3	43.3	do	.08, .23*, .15	From end of bar / From middle of bar: From bar as received.
6412	S M	.505	.20	74,000	137,550	15.7	43.3	do	.10, .28*, .09	
6413	S_1 E	.505	.20	68,000	133,100	15.0	37.1	Fine silky, trace of granulation	.13, .23*, .09	From end of bar / From middle of bar: From bar as received.
6414	S_1 M	.505	.20	69,000	134,300	15.0	37.1	do	.09, .19*, .07	
6417	81 R	.505	.20	66,000	119,050	18.3	46.2	Fine silky	.17, .28*, .10	From bar as received: Red end bars.
6418	81 R R	.505	.20	56,000	104,550	19.0	46.2	do	.12, .33*, .12	From breech end of barrel, rolled and annealed: Red end bars.
6419	81 G	.505	.20	68,000	111,500	19.0	43.3	do	.13, .32*, .12	From bar as received: Green end bars.
6420	81 R G	.505	.20	59,000	98,550	21.7	43.3	do	.16, .35*, .14	From breech end of barrel, rolled and annealed: Green end bars.
6438	S_1	.505	.20	[1] 44,000	112,900	12.0	16.9	Fine granular	.16*, .12, .08	From rolled barrel, reheated in new annealing furnace, and annealed in charcoal.

[1] About.

NOTE.—Where two diameters are given the specimens were hollow, the figures indicating the exterior and interior diameters, respectively.

RECEIVERS OF RIFLES, .30-CALIBER.

No. 6085.

Marks, 37 R.F. 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	0.	.....	
7,000	35,000	.001133	.000166	.....	.....	
8,000	40,000	.001333	.000200	.....	.....	
8,200	41,000	.001367	.000034	.....	.....	
8,400	42,000	.001400	.000033	.....	.....	Elastic limit.
		.006833	.005433	.....	.....	
8,600	43,000	.007967	.001134	.....	.....	
8,800	44,000	.008833	.000866	.....	.....	
9,000	45,000	.009767	.001434	.....	.....	
9,200	46,000	.010500	.000733	.....	.....	
9,600	48,000	.012400	.001900	.....	.....	
10,000	50,000	.014333	.001933	.....	.....	
10,400	52,000	.017333	.003000	.....	.....	
10,800	54,000	.019667	.002334	.....	.....	
11,200	56,000	.022333	.002666	.....	.....	
11,600	58,000	.025067	.002734	.....	.....	
12,000	60,000	.028833	.003766	.....	.....	
12,400	62,000	.032333	.003500	.....	.....	
12,800	64,000	.036167	.003834	.....	.....	
13,200	66,000	.041833	.005666	.....	.....	
13,600	68,000	.046000	.004167	.....	.....	
14,000	70,000	.051667	.005667	.....	.....	
14,400	72,000	.059000	.007333	.....	.....	
14,800	74,000	.067000	.008000	.....	.....	
15,200	76,000	.0767	.0097	.....	.....	
15,600	78,000	.0967	.0200	.....	.....	
16,000	80,000	.1233	.0266	.....	.....	
16,220	81,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,100
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.2567
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1".6 from neck
Character of broken surface		silky
Elongation of inch sections		".16, ".42, ".19

No. 6086.

Marks, 37 R 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	.....	
2,000	10,000	.000267	.000200	.....	.....	
4,000	20,000	.000600	.000333	.....	.....	
6,000	30,000	.000933	.000333	0.	.....	
8,000	40,000	.001200	.000267	.....	.....	
8,200	41,000	.001233	.000033	.....	.....	
8,400	42,000	.001300	.000067	.....	.....	
8,600	43,000	.001333	.000033	.....	.....	
8,800	44,000	.001367	.000034	.....	.....	
9,000	45,000	.001400	.000033	.....	.....	Elastic limit.
9,200	46,000	.016667	.015267	.....	.....	
9,400	47,000	.018333	.001666	.....	.....	
9,600	48,000	.019667	.001334	.....	.....	
9,800	49,000	.020500	.000833	.....	.....	
10,000	50,000	.021867	.001367	.....	.....	
10,400	52,000	.024833	.002966	.....	.....	
10,800	54,000	.028333	.003500	.....	.....	
11,200	56,000	.031533	.003200	.....	.....	
11,600	58,000	.036000	.004467	.....	.....	
12,000	60,000	.041167	.005167	.....	.....	
12,400	62,000	.046000	.004833	.....	.....	
12,800	64,000	.051667	.005667	.....	.....	
13,200	66,000	.058667	.007000	.....	.....	
13,600	68,000	.067333	.008666	.....	.....	
14,000	70,000	.079667	.012334	.....	.....	
14,400	72,000	.0933	.013666	.....	.....	
14,800	74,000	.1233	.0300	.....	.....	
15,200	76,000	.1767	.0534	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds....	76,000
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2833
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".20, ".45*, ".20

No. 6315.

Marks 38 R.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,006	.000333	.000200	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	0.	.....	
8,200	41,000	.001400	.000033	.....	.....	
8,400	42,000	.001433	.000033	.....	.....	
8,600	43,000	.001500	.000067	.....	.....	
8,800	44,000	.001533	.000033	.....	.....	
9,000	45,000	.001600	.000067	.....	.....	Elastic limit.
9,200	46,000	.001933	.000333	.....	.....	
9,400	47,000	.002833	.000900	.....	.....	
9,600	48,000	.003667	.000834	.....	.....	
9,800	49,000	.005067	.001400	.....	.....	
10,000	50,000	.007667	.002600	.....	.....	
10,400	52,000	.010400	.002733	.....	.....	
10,800	54,000	.012000	.001600	.....	.....	
11,200	56,000	.014000	.002000	.....	.....	
12,000	60,000	.018767	.004767	.....	.....	
12,800	64,000	.023333	.004566	.....	.....	
13,600	68,000	.028667	.005334	.....	.....	
14,400	72,000	.035500	.006833	.....	.....	
15,200	76,000	.043167	.007667	.....	.....	
16,000	80,000	.054333	.011166	.....	.....	
16,800	84,000	.068600	.014267	.....	.....	
17,600	88,000	.095667	.027067	.....	.....	
18,170	90,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,850
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1".6 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".18, ".37⁸, ".17

No. 6316.

Marks, 38 R. F.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	.....	.....	
8,000	40,000	.001367	.000367	0.	.....	
9,200	46,000	.001600	.000233	.....	.....	
9,400	47,000	.001633	.000033	.....	.....	Elastic limit.
9,600	48,000	.012000	.010367	.....	.....	
9,800	49,000	.012500	.000500	.....	.....	
10,000	50,000	.013000	.000500	.....	.....	
10,400	52,000	.015267	.002267	.....	.....	
10,800	54,000	.017267	.002000	.....	.....	
11,200	56,000	.019500	.002233	.....	.....	
12,000	60,000	.025000	.005500	.....	.....	
12,800	64,000	.030333	.005333	.....	.....	
13,600	68,000	.036667	.006334	.....	.....	
14,400	72,000	.045500	.008833	.....	.....	
15,200	76,000	.056667	.011167	.....	.....	
16,000	80,000	.071000	.014333	.....	.....	
16,800	84,000	.098667	.027667	.....	.....	
17,320	86,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,600
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		".9 from neck
Character of broken surface		silky, black spot in center of fractured surface ".06 diameter, spongy at center.
Elongation of inch sections		".14, ".19, ".30*

From Bar.

No. 6401.

Marks, R. C.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000300	.000167	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	0.	.....	
7,000	35,000	.001167	.000167	.....	.....	
7,200	36,000	.001233	.000066	.....	.....	Elastic limit.
7,400	37,000	.021767	.020534	.....	.....	
7,600	38,000	.024000	.002233	.....	.....	
7,800	39,000	.025733	.001733	.....	.....	
8,000	40,000	.027667	.001934	.....	.....	
8,400	42,000	.032333	.004666	.....	.....	
8,800	44,000	.037333	.005000	.....	.....	
9,200	46,000	.043333	.006000	.....	.....	
9,600	48,000	.050333	.007000	.....	.....	
10,000	50,000	.058667	.008334	.....	.....	
10,400	52,000	.068000	.009333	.....	.....	
10,800	54,000	.082167	.014167	.....	.....	
11,940	59,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	59,700
Elastic limit per square inch of original section	do...	36,000
Elongation per inch after rupture	inch..	.3333
Elongation per inch under strain at elastic limit	do...	.001233
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		59.8
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".23, ".54*, ".23

Forged Stock.

No. 6402.

Marks, R. C. F.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	.....	
2,000	10,000	.000800	.000167	.....	.....	
4,000	20,000	.000833	.000833	.....	.....	
6,000	30,000	.000967	.000334	0.	.....	
8,000	40,000	.001367	.000400	.....	.....	
9,000	45,000	.001567	.000200	.....	.....	
9,200	46,000	.001600	.000083	.....	.....	
9,400	47,000	.001633	.000083	.....	.....	
9,600	48,000	.001667	.000084	.....	.....	
9,800	49,000	.001667	0.	.....	.....	
10,000	50,000	.001700	.000033	.....	.....	
10,200	51,000	.001733	.000033	.....	.....	
10,400	52,000	.001767	.000034	.....	.....	Elastic limit.
10,600	53,000	.020500	.018733	.....	.....	
10,800	54,000	.021333	.000833	.....	.....	
11,000	55,000	.022667	.001334	.....	.....	
11,200	56,000	.023733	.001066	.....	.....	
11,600	58,000	.027333	.003600	.....	.....	
12,000	60,000	.030333	.003000	.....	.....	
12,400	62,000	.034333	.004000	.....	.....	
12,800	64,000	.038833	.004500	.....	.....	
13,200	66,000	.043667	.004834	.....	.....	
13,600	68,000	.048000	.004333	.....	.....	
14,000	70,000	.055667	.007667	.....	.....	
16,110	80,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,550
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2367
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".17 from neck
Character of broken surface		fine, silky, oblique; seam at center about ".08 wide
Elongation of inch sections		".81*, ".24, ".16

No. 6415.

From bar as received.
Marks, R C 1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000333	.000233	.....	.....	
4,000	20,000	.000667	.000334	.....	.....	
6,000	30,000	.001000	.000333	0.	.....	
7,600	38,000	.001267	.000267	.....	.....	
7,800	39,000	.001333	.000066	.....	.....	Elastic limit.
8,000	40,000	.001633	.000300	.....	.....	
8,200	41,000	.011667	.010034	.....	.....	
8,400	42,000	.012400	.000733	.....	.....	
8,600	43,000	.013067	.000667	.....	.....	
8,800	44,000	.014000	.000933	.....	.....	
9,200	46,000	.016333	.002333	.....	.....	
9,600	48,000	.018500	.002167	.....	.....	
10,000	50,000	.020700	.002200	.....	.....	
10,800	54,000	.026000	.005300	.....	.....	
11,600	58,000	.032833	.006833	.....	.....	
12,400	62,000	.039333	.006500	.....	.....	
13,200	66,000	.049667	.010334	.....	.....	
15,570	77,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,850
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001333
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.20, ″.33*, ″.17

Piece of Bar Forged and Subsequently Annealed.

No. 6416.

Marks, R C 1 F.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.000967	.000334	0.	.....	
7,000	35,000	.001167	.000200	.....	.....	
7,200	36,000	.001200	.000033	.....	.....	
7,400	37,000	.001233	.000033	.....	.....	Elastic limit.
7,600	38,000	.020667	.019434	.....	.....	
7,800	39,000	.022000	.001333	.....	.....	
8,000	40,000	.023667	.001667	.....	.....	
8,200	41,000	.025733	.002066	.....	.....	
8,400	42,000	.027500	.001767	.....	.....	
8,800	44,000	.031667	.004167	.....	.....	
9,200	46,000	.035667	.004000	.....	.....	
9,600	48,000	.041333	.005666	.....	.....	
10,000	50,000	.047000	.005667	.....	.....	
10,800	54,000	.060000	.013000	.....	.....	
12,690	63,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	63,450
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.3000
Elongation per inch under strain at elastic limit	do...	.001233
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".22, ".46*, ".22

From Receiver Forging, Forged and Annealed.

No. 6439.

Marks, R F.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	.....	.....	
2,000	10,000	.000300	.000167	.....	.....	
4,000	20,000	.000633	.000333	.....	.....	
6,000	30,000	.001000	.000367	.....	.....	Elastic limit.
		.012667	.011667	.....	.....	
6,200	31,000	.014333	.001666	.....	.....	
6,400	32,000	.015000	.000667	.....	.....	
6,600	33,000	.016833	.001833	.....	.....	
6,800	34,000	.018333	.001500	.....	.....	
7,000	35,000	.020000	.001667	.....	.....	
7,200	36,000	.021500	.001500	.....	.....	
7,600	38,000	.024667	.003167	.....	.....	
8,000	40,000	.030333	.005666	.....	.....	
8,400	42,000	.033667	.003334	.....	.....	
8,800	44,000	.039333	.005666	.....	.....	
9,200	46,000	.046000	.006667	.....	.....	
9,600	48,000	.052667	.006667	.....	.....	
10,000	50,000	.061333	.008666	.....	.....	
11,970	59,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	59,850
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.3267
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".24, ".51*, ".23

TABULATION OF TENSION SPECIMENS FROM STEEL FOR RECEIVERS OF RIFLES (LENGTH OF STEMS 3″).

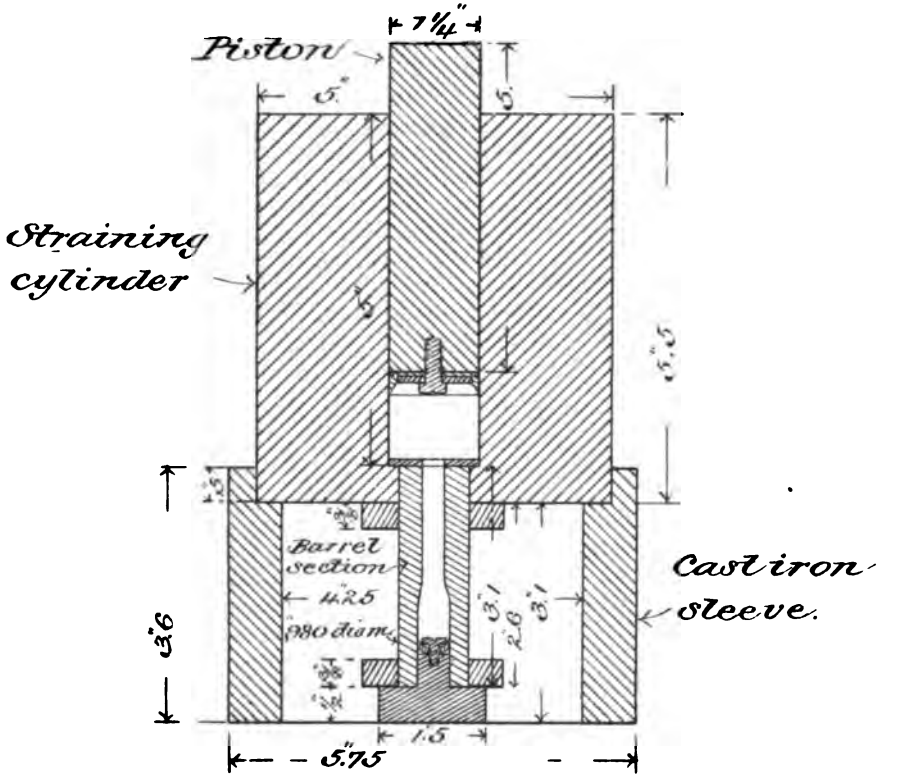
No of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 3-inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	Remarks.
		Inch.	*Inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		″ ″ ″	
6085	37 R F 2....	0.505	0.20	42,000	81,100	25.7	49.1	Silky	.16, .42*, .19	
6086	37 R 2.....	.505	.20	45,000	76,000	28.3	51.9	.....do	.20, .45*, .20	
6315	38 R	.505	.20	45,000	90,850	24.0	46.2	Fine silky	.18, .37*, .17	
6316	38 R F.....	.505	.20	47,000	86,600	21.0	37.1	Silky, black spot in center of fractured surface ″.06 diameter; spongy at center.	.14, .19, .30*	
6401	R C.....	.505	.20	36,000	59,700	33.3	59.8	Fine silky, cup-shaped	.23, .54*, .23	From bar.
6402	R C F.....	.505	.20	52,000	80,550	23.7	40.3	Fine silky, oblique; seam at center about ″.08 wide.	.31*, .24, .16	Forged stock.
6415	R C 1	.505	.20	39,000	77,850	23.3	37.1	Silky	.20, .33*, .17	From bar as received.
6416	R C 1 F.....	.505	.20	37,000	63,450	30.0	49.1	Fine silky	.22, .46*, .22	Piece of bar forged and subsequently annealed.
6439	R F.....	.505	.20	30,000	59,850	32.7	57.2	.....do	.24, .51*, .23	From receiver forging, forged and annealed.

RIFLE BARRELS, .30 CALIBER.

HYDROSTATIC TESTS OF BREECH SECTIONS.

Rifle Barrels, 30 caliber.

Attachment for straining breech sections with hydrostatic pressure.



HYDROSTATIC TESTS OF RIFLE BARRELS.

Tests were made on sections 3.1 inches long taken from the breech ends of twelve finished .30 caliber barrels.

Three different grades of metal are represented, one grade of which was tested both after the ordinary operation of forging and rifling and also after the metal as a final operation was oil tempered, so called, at the butt.

The oil tempering consisted of heating the butt end of the barrel and quenching the same by means of a stream of oil forced through the bore.

The apparatus used for applying pressure to the barrel sections, shown on the accompanying drawing, consisted of a straining cylinder having a bore 1¼ inches diameter mounted over the specimen and supported by a cast-iron sleeve.

The barrel section at the breech end was closed by a piston entering the powder chamber a distance of three-eighths of an inch, suitably packed with a cup leather packing.

The forward end of the test specimen entered the straining cylinder a distance of one-half inch and was packed by a flat leather washer covering the joint. The barrel section also carried two three-eighths inch reenforcing rings, shrunk on in their places.

The reinforcing rings were for the purpose of preventing such expansion of the test piece over the cup leather packing at one end as would destroy the efficiency of the packing, and at the other end injury to the straining cylinder was prevented. Incidentally these rings would, without doubt, tend to increase the apparent strength of the test piece. The free length of the latter was 1.85 inches.

Loads were applied to the piston of the straining cylinder, and the stress per square inch on the piston was taken as the pressure in the bore and on the test piece, no correction for packing friction being made.

The cast-iron sleeve was cut away on one side to permit of access to the barrel section during the test, which was measured after each increment of pressure.

The restricted space in which the measurements of the barrel section were taken made it inexpedient to record the results closer than the nearest thousandth of an inch.

Upon release of pressure the test pieces showed a resilience of ".001±; hence when the expansion in diameter exceeded this amount the excess represents the permanent expansion of the metal.

The elastic limits of the several barrels are thus shown to be below 40,750 pounds per square inch interior pressure.

No. 9640.

Section from Barrel Marked 75 S., Bessemer Steel.

Exterior diameter of section ".980.

Applied load on 1¼" piston, 75,000 pounds = 61,120 pounds per square inch pressure.

The maximum exterior diameter of the section of barrel after the test was ".994, thus showing a permanent extension of ".014.

No. 9641.

Section from Barrel Marked 49, Bessemer Steel

Exterior diameter ".980.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
44,820	.992	.012	
52,970	1.001	.021	
59,480	.....	.....	Maximum pressure reached.
0	1.018	.038	Maximum diameter after testing, thus showing a permanent expansion of ".038.

No. 9642.

Section from Barrel Marked 75 S. Oil Tempered at Butt.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.982	0.	Initial load.
24,450	.982	0.	Measurements under load were taken at middle of length of the barrel section.
28,520	.982+	0.	
32,600	.982+	0.	
36,670	.985	.003	
38,710	.987	.005	
40,750	.988	.006	
44,820	.991	.009	
48,900	.995	.013	
52,970	.999	.017	The diameter recorded after release of pressure was the maximum found and was taken near the threaded section.
61,120	1.012	.030	
0	1.018	.031	

No. 9643.

Section from Barrel Marked 11, Bessemer Steel.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.981	0.	Initial load.
24,450	.981	0.	
28,520	.981	0.	
32,600	.982−	.001	
36,670	.984	.003	
38,710	.986	.005	
40,750	.988	.007	
16,300	.987	.006	
42,790	.989	.008	
44,820	.991	.010	
46,860	.992	.011	
48,900	.994	.013	
16,300	.998	.012	
52,970	.998	.017	
57,050	1.002	.021	
61,120	1.009	.028	
16,300	1.007	.026	
61,120	1.010	.029	
16,300	1.008	.027	
0	1.008	.027	

No. 9644.

Section from Barrel Marked 75 S.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.980+	0.	Initial load.
24,450	.981−	0.	
28,520	.981−	.001	
32,600	.981	.001	
36,670	.982	.002	
38,710	.983+	.003	
40,750	.985	.005	
16,300	.984	.004	
42,790	.986+	.006	
44,820	.988	.008	
48,900	.991	.011	
16,300	.990	.010	
52,970	.994	.014	
57,050	.997	.017	
61,120	1.002	.022	
16,300	1.001−	.021	
0	1.001	.021	

No. 9645.

Section from Barrel Marked 11.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inch.*	*Inch.*	
16,300	.981	0.	Initial load.
24,450	.981	0.	
28,520	.981	0.	
32,600	.982	.001	
36,670	.984	.003	
38,710	.985	.004	
40,750	.986	.005	
16,300	.985+	.004	
42,790	.987	.006	
44,820	.989	.008	
46,860	.990	.009	
48,900	.993	.012	
16,300	.992	.011	
52,970	.996	.015	
57,050	.999	.018	
61,120			
0	1.003	.022	

No. 9646.

Section from Barrel Marked 49.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.981	0.	Initial load.
24,450	.981+	0.	
28,520	.982	.001	
32,600	.982	.001	
36,670	.984	.003	
38,710	.986	.005	
40,750	.987	.006	
16,300	.986	.005	
42,790	.989	.008	
44,820	.991	.010	
48,900	.995	.014	
52,970	.998	.017	
57,050	1.006	.025	
61,120	1.010	.029	
16,300	1.009	.028	

No. 9647.

SECTION FROM BARREL MARKED 75 S, OIL-TEMPERED AT BUTT.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.981	0.	Initial load.
24,450	.981	0.	
28,520	.981+	0.	
32,600	.982	.001	
34,640	.982	.001	
36,670	.983	.002	
38,710	.986	.005	
40,750	.988−	.007	
16,300	.987−	.006	
42,790	.989	.008	
44,820	.990+	.009	
48,900	.993	.012	
52,970	.996	.015	
57,050	1.003	.022	
61,120	1.007−	.026	
16,300	1.005+	.024	

No. 9648.

SECTION FROM BARREL MARKED 75 S.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.981	0.	Initial load.
24,450	.981	0.	
28,520	.981+	0.	
32,600	.982	.001	
34,640	.983	.002	
36,670	.984	.003	
38,710	.986	.005	
40,750	.987	.006	
16,300	.986	.005	
42,790	.989	.008	
44,820	.991	.010	
48,900	.994	.013	
52,970	.998+	.017	
57,050	1.004	.023	
61,120	1.009+	.028	
16,300	1.008	.027	
0	1.008	.027	

No. 9649.

Section from Barrel Marked 49.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.980	0.	Initial load.
24,450	.980	0.	
28,520	.980+	0.	
32,600	.981−	.001	
34,640	.982−	.002	
36,670	.983	.003	
38,710	.985	.005	
40,750	.986	.006	
16,300	.985	.005	
42,790	.988	.008	
44,820	.989	.009	
48,900	.993−	.013	
52,970	.996+	.016	
57,050	1.001	.021	
61,120	1.009+	.029	
16,300	1.008−	.028	

No. 9650.

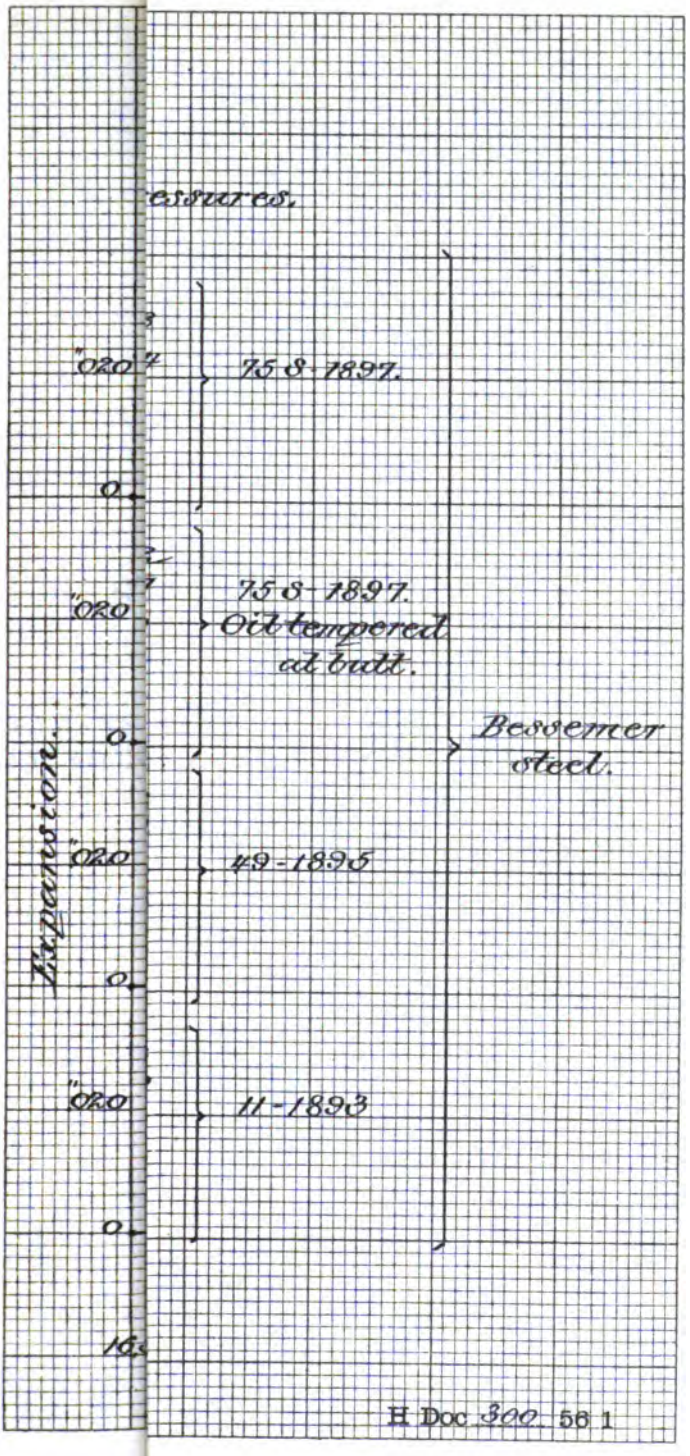
Section from Barrel Marked 11.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.980	0.	Initial load.
24,450	.980	0.	
28,520	.980+	0.	
32,600	.981	.001	
34,640	.983−	.003	
36,670	.984	.004	
38,710	.985	.005	
40,750	.987	.007	
16,300	.986	.006	
42,790	.988	.008	
44,820	.990	.010	
48,900	.993	.013	
52,970	.997	.017	
57,050	1.004	.024	
61,120	1.006+	.026	
16,300	1.005	.025	

No. 9651.

SECTION FROM BARREL MARKED 75 S, OIL-TEMPERED AT BUTT.

Pressure per square inch.	Barrel section.		Remarks.
	Diameter.	Expansion.	
Pounds.	*Inches.*	*Inch.*	
16,300	.980	0.	Initial load.
24,450	.980+	0.	
28,520	.980+	0.	
32,600	.981	.001	
34,640	.981	.001	
36,670	.981	.001	
38,710	.982−	.002	
40,750	.983−	.003	
16,300	.982−	.002	
42,790	.984	.004	
44,820	.985+	.005	
46,860	.987	.007	
48,900	.989 −	.009	
52,970	.992	.012	
57,050	.995	.015	
61,120	.998+	.018	
16,300	.997	.017	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Expansion.
75 S - 1897.
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Oil tempered
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49 - 1895
11 - 1893

STEEL FOR GUN MOUNTS.

SPECIMENS FROM PIVOT SOCKETS, INNER BASES, PISTON RODS, AND AXLE FOR 6-POUNDER AND 15-POUNDER MOUNTS.

PIVOT SOCKETS—6-POUNDER GUN MOUNTS.

STEEL CASTINGS.

No. 6170.

Marks, $\frac{A-2}{P\ S\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	.....	.....	
2,000	10,000	.000300	.000150	.....	.....	
3,000	15,000	.000300	.000200	.....	.....	
4,000	20,000	.000950	.000450	.000800	.000300	
4,200	21,000	.001600	.000650	.....	.....	
4,400	22,000	.002100	.000500	.....	.....	
4,600	23,000	.003550	.001450	.....	.....	
4,800	24,000	.004500	.000950	.....	.....	
5,000	25,000	.005700	.001200	.....	.....	
5,200	26,000	.006750	.001050	.....	.....	
5,400	27,000	.008000	.001250	.....	.....	
5,600	28,000	.009250	.001250	.....	.....	
5,800	29,000	.010650	.001400	.....	.....	
6,000	30,000	.012500	.001850	.011400	.011100	
10,890	54,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	54,450
Elastic limit per square inch of original section		below 20,00 pounds
Elongation per inch after rupture	inch..	.1350
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".60 from neck
Character of broken surface		granular, dark spot at circumference
Elongation of inch sections		".12, ".15[a]

No. 6219.

Marks, $\frac{A\,6}{P\,S\,6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
4,200	21,000	.000750	.000100	.....	.....	Elastic limit.
4,400	22,000	.001250	.000500	.....	.....	
4,600	23,000	.002500	.001250	.....	.....	
4,800	24,000	.003700	.001200	.....	.....	
5,000	25,000	.004900	.001200	.....	.....	
5,200	26,000	.005950	.001050	.....	.....	
5,400	27,000	.007500	.001550	.....	.....	
5,600	28,000	.008600	.001100	.....	.....	
5,800	29,000	.010000	.001400	.....	.....	
6,000	30,000	.011450	.001450	.....	.....	
11,640	58,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	58,200
Elastic limit per square inch of original section	do...	21,000
Elongation per inch after rupture	inch..	.3000
Elongation per inch under strain at elastic limit	do...	.000750
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		at middle of stem
Character of broken surface		dull, silky
Elongation of inch sections		".32*, ".28*

No. 6220.

Marks, $\frac{A\ 7}{P\ S\ 6}$
Diameter, ".504.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000550	.000200	.....	.....	
3,800	19,000	.000700	.000150	.....	.....	Elastic limit.
4,000	20,000	.000950	.000250	.....	.....	
4,200	21,000	.001100	.000150	.....	.....	
4,400	22,000	.001600	.000500	.....	.....	
4,600	23,000	.002550	.000950	.....	.....	
4,800	24,000	.003500	.000950	.....	.....	
5,000	25,000	.004900	.001400	.....	.....	
5,200	26,000	.006100	.001200	.....	.....	
5,400	27,000	.007500	.001400	.....	.....	
5,600	28,000	.008750	.001250	.....	.....	
5,800	29,000	.010100	.001350	.....	.....	
6,000	30,000	.011750	.001650	.....	.....	
11,560	57,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	57,800
Elastic limit per square inch of original section	do...	19,000
Elongation per inch after ruture	inch..	.2600
Elongation per inch under strain at elastic limit	do...	.000700
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1" from neck
Character of broken surface		dull, silky
Elongation of inch sections		".21, ".31*

No. 6221.

Marks, $\frac{A-8}{P\ S\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000500	.000250	.....	.....	
4,000	20,000	.000600	.000100	.....	.....	
5,000	25,000	.000800	.000200	.....	.....	
6,000	30,000	.001000	.000200	0.	.....	
7,000	35,000	.001150	.000150	.....	.....	
8,000	40,000	.001350	.000200	.....	.....	
8,200	41,000	.001400	.000050	.....	.....	
8,400	42,000	.001450	.000050	.....	.....	
8,600	43,000	.001550	.000100	.....	.....	Elastic limit.
8,800	44,000	.002100	.000550	.....	.....	
9,000	45,000	.003450	.001350	.....	.....	
9,200	46,000	.005100	.001650	.....	.....	
9,400	47,000	.006150	.001050	.....	.....	
9,600	48,000	.007000	.000850	.....	.....	
9,800	49,000	.007600	.000600	.....	.....	
10,000	50,000	.008450	.000850	.....	.....	
19,920	99,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,600
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".9 from neck
Character of broken surface		granular, dull spot at the circumference. Opened cracks in surface of stem.
Elongation of inch sections		".11*, ".11

No. 6222.

Marks, $\frac{A-9}{P\,8\,6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000700	.000200	.....	.....	Elastic limit.
4,200	21,000	.000850	.000150	.....	.....	
4,400	22,000	.000950	.000100	.....	.....	
4,600	23,000	.001400	.000450	.....	.....	
4,800	24,000	.002100	.000700	.....	.....	
5,000	25,000	.008100	.001000	.....	.....	
5,200	26,000	.004750	.001650	.....	.....	
5,400	27,000	.005800	.001050	.....	.....	
5,600	28,000	.006500	.000700	.....	.....	
5,800	29,000	.007650	.001150	.....	.....	
6,000	30,000	.009000	.001350	.....	.....	
12,030	60,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	60,150
Elastic limit per square inch of original section	do...	20,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.000700
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		1" from neck
Character of broken surface		dull amorphous
Elongation of inch sections		".25", ".20

No. 6223.

Marks, $\frac{A-10}{P S 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	.....	
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000750	.000250	.....	.....	
4,200	21,000	.000850	.000100	.....	.....	Elastic limit.
4,400	22,000	.001000	.000150	.....	.....	
4,600	23,000	.001400	.000400	.....	.....	
4,800	24,000	.002000	.000600	.....	.....	
5,000	25,000	.002900	.000900	.....	.....	
5,200	26,000	.004150	.001250	.....	.....	
5,400	27,000	.005300	.001150	.....	.....	
5,600	28,000	.006500	.001200	.....	.....	
5,800	29,000	.007650	.001150	.....	.....	
6,000	30,000	.009000	.001350	.....	.....	
19,980	99,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,900
Elastic limit per square inch of original section	do...	21,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".7 from neck
Character of broken surface		dull silky, trace of granulation
Elongation of inch sections		".18, ".24*

No. 6224.

Marks, $\frac{A\text{-}11}{P\ S\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	Elastic limit.
4,200	21,000	.000850	.000200	.....	.....	
4,400	22,000	.001000	.000150	.....	.....	
4,600	23,000	.001500	.000500	.....	.....	
4,800	24,000	.002150	.000650	.....	.....	
5,000	25,000	.003000	.000850	.....	.....	
5,200	26,000	.004150	.001150	.....	.....	
5,400	27,000	.005500	.001350	.....	.....	
5,600	28,000	.006550	.001050	.....	.....	
5,800	29,000	.007750	.001200	.....	.....	
6,000	30,000	.009200	.001450	.....	.....	Tensile strength.
12,110	60,550	.....	.....	.....	.....	

General summary.

Tensile strength per square inch of original section	Pounds..
Elastic limit per square inch of original section	do...
Elongation per inch after rupture	inch..
Elongation per inch under strain at elastic limit	do...
Reduction in diameter at point of rupture	do...
Reduction in area after rupture, per cent of original section	
Position of rupture	".7 fr
Character of broken surface	full sm
Elongation of inch sections	"

No. 6225.

Marks, $\frac{A-12}{P\,S\,6}$
Diameter, ".504.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive Elongation per inch.	Permanent set.	Successive Permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	Elastic limit.
4,200	21,000	.000850	.000250	.....	.....	
4,400	22,000	.001100	.000250	.....	.....	
4,600	23,000	.001650	.000550	.....	.....	
4,800	24,000	.002450	.000800	.....	.....	
5,000	25,000	.003550	.001100	.....	.....	
5,200	26,000	.004700	.001150	.....	.....	
5,400	27,000	.005850	.001150	.....	.....	
5,600	28,000	.007000	.001150	.....	.....	
5,800	29,000	.008250	.001250	.....	.....	
6,000	30,000	.009300	.001050	.....	.....	
11,970	59,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	59,850
Elastic limit per square inch of original section	do...	20,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.000600
Reduction in diameter at point of rupture	do...	.074
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		".95 from neck
Character of broken surface		dull amorphous
Elongation of inch sections		".18, ".25*

No. 6237.

Marks, $\frac{A-13}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
3,000	15,000	.000600	.000200	.....	.....	
4,000	20,000	.000700	.000100	.....	.....	
5,000	25,000	.000850	.000150	.....	.....	Elastic limit.
5,200	26,000	.000950	.000100	.....	.....	
5,400	27,000	.011550	.010600	.....	.....	
5,600	28,000	.013500	.001950	.....	.....	
5,800	29,000	.014600	.001100	.....	.....	
6,000	30,000	.016750	.002150	.....	.....	
11,080	55,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	55,400
Elastic limit per square inch of original section	do...	25,000
Elongation per inch after rupture	inch..	.3500
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		54.6
Position of rupture		1″.2 from neck
Character of broken surface		silky
Elongation of inch sections		″.42*, ″.28

No. 6238.

Marks, $\frac{A\ 14}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
5,000	25,000	.000800	.000250	.....	.....	
6,000	30,000	.001000	.000200	.....	.....	
6,200	31,000	.001050	.000050	.....	.....	
6,400	32,000	.001050	0.	.....	.....	
6,600	33,000	.001100	.000050	.....	.....	Elastic limit.
6,800	34,000	.002000	.000900	.....	.....	
7,000	35,000	.022900	.020900	.....	.....	
7,200	36,000	.024500	.001600	.....	.....	
7,400	37,000	.026650	.002150	.....	.....	
7,600	38,000	.028600	.001950	.....	.....	
7,800	39,000	.031400	.002800	.....	.....	
8,000	40,000	.035000	.003600	.....	.....	
11,910	59,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	59,550
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.3500
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		59.8
Position of rupture		1″.2 from neck
Character of broken surface		silky
Elongation of inch sections		″.31, ″.39*

No. 6239.

Marks, $\frac{A\ 15}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000700	.000300	.....	.....	
5,000	25,000	.000850	.000150	.....	.....	
6,000	30,000	.001000	.000150	.....	.....	
6,200	31,000	.001050	.000050	.....	.....	Elastic limit.
6,400	32,000	.011150	.010100	.....	.....	
6,600	33,000	.012250	.001100	.....	.....	
6,800	34,000	.013050	.000800	.....	.....	
7,000	35,000	.014250	.001200	.....	.....	
7,200	36,000	.015750	.001500	.....	.....	
7,400	37,000	.017250	.001500	.....	.....	
7,600	38,000	.018250	.001000	.....	.....	
7,800	39,000	.019650	.001400	.....	.....	
8,000	40,000	.021850	.002200	.....	.....	
13,220	66,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	66,100
Elastic limit per square inch of original section	do...	31,000
Elongation per inch after rupture	inch..	.2550
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		″.95 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		″.30*, ″.21

No. 6240.

Marks, $\frac{A-16}{P\ S\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000650	.000250	.....	.....	
5,200	26,000	.001000	.000350	.....	.....	
5,400	27,000	.001050	.000050	.....	.....	Elastic limit.
5,600	28,000	.015000	.013950	.....	.....	
5,800	29,000	.016250	.001250	.....	.....	
6,000	30,000	.017750	.001500	.....	.....	
6,200	31,000	.019500	.001750	.....	.....	
6,400	32,000	.021550	.002050	.....	.....	
6,600	33,000	.024000	.002450	.....	.....	
6,800	34,000	.026250	.002250	.....	.....	
7,000	35,000	.028800	.002550	.....	.....	
10,920	54,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	54,600
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.3700
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		1″.26 from neck
Character of broken surface		silky
Elongation of inch sections		″.31, ″.43*

No. 6241.

Marks, $\frac{A-17}{PS6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.001000	.000450	.....	.....	
6,200	31,000	.001050	.000050	.....	.....	Elastic limit.
6,400	32,000	.013250	.012200	.....	.....	
6,600	33,000	.014050	.000800	.....	.....	
6,800	34,000	.015300	.001250	.....	.....	
7,000	35,000	.017050	.001750	.....	.....	
7,200	36,000	.018900	.001850	.....	.....	
7,400	37,000	.020550	.001650	.....	.....	
7,600	38,000	.022400	.001850	.....	.....	
7,800	39,000	.024600	.002200	.....	.....	
8,000	40,000	.026600	.002000	.....	.....	
12,180	60,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	60,900
Elastic limit per square inch of original section	do...	31,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		″.5 from neck
Character of broken surface		dull gray, amorphous
Elongation of inch sections		″.17, ″.26*

No. 6242.

Marks, $\frac{A-18}{P\,S\,6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	Elastic limit.
6,200	31,000	.011050	.010100	.....	.....	
6,400	32,000	.011950	.000900	.....	.....	
6,600	33,000	.013000	.001050	.....	.....	
6,800	34,000	.014500	.001500	.....	.....	
7,000	35,000	.015800	.001300	.....	.....	
12,210	61,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	61,050
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.000950
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		".9 from neck
Character of broken surface		dull gray, amorphous
Elongation of inch sections		".19, ".23*

No. 6275.

Marks, $\frac{A-19}{P\ S\ 6.}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000500	.000200	.....	.....	
4,000	20,000	.000600	.000100	0.	.....	
5,000	25,000	.000750	.000150	.....	.....	
6,000	30,000	.001000	.000250	0.	.....	
7,000	35,000	.001200	.000200	.....	.....	Elastic limit.
7,200	36,000	.001500	.000300	.....	.....	
7,400	37,000	.012250	.010750	.....	.....	
7,600	38,000	.013500	.001250	.....	.....	
7,800	39,000	.014500	.001000	.....	.....	
8,000	40,000	.015500	.001000	.....	.....	
14,100	70,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70,500
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section	.....	30.7
Position of rupture		1" from neck
Character of broken surface		silky, serrated
Elongation of inch sections		".25*, ".20

No. 6276.

Marks, $\frac{A-20}{P\,S\,6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000600	.000100	.....	.....	
5,000	25,000	.000900	.000300	.....	.....	
6,000	30,000	.001050	.000150	0.	.....	
7,000	35,000	.001300	.000250	.....	.....	
7,200	36,000	.001400	.000100	.....	.....	
7,400	37,000	.001450	.000050	.....	.....	
7,600	38,000	.001500	.000050	.....	.....	
7,800	39,000	.001550	.000050	.....	.....	Elastic limit.
8,000	40,000	.013500	.011950	.....	.....	
8,200	41,000	.014400	.000900	.....	.....	
8,400	42,000	.015900	.001500	.....	.....	
8,600	43,000	.016850	.000950	.....	.....	
8,800	44,000	.017900	.001050	.....	.....	
9,000	45,000	.019150	.001250	.....	.....	
14,850	74,250	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	74,250
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".75 from neck
Character of broken surface		granular 60 per cent, silky 40 per cent
Elongation of inch sections		".19*, ".15

No. 6298.

Marks, $\frac{A-21}{P\,S\,6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
4,200	21,000	.000750	.000100	.....	.....	
4,400	22,000	.000850	.000100	.....	.....	
4,600	23,000	.000900	.000050	.....	.....	
4,800	24,000	.001000	.000100	.....	.....	
5,000	25,000	.001100	.000100	.000800	.000800	Elastic limit, approximate.
5,200	26,000	.001500	.000400	.....	.....	
5,400	27,000	.002250	.000750	.....	.....	
5,600	28,000	.003500	.001250	.....	.....	
5,800	29,000	.004300	.000800	.....	.....	
6,000	30,000	.005500	.001200	.....	.....	
13,440	67,200	.....	.....	.....	.....	Tensile strength

General summary.

Tensile strength per square inch of original section	pounds..	67,200
Elastic limit per square inch of original section (approximate)	do...	25,000
Elongation per inch after rupture	inch..	.3000
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1".14 from neck
Character of broken surface		dull, silky
Elongation of inch sections		".28, ".32*

No. 6299.

Marks, $\frac{A\ 22}{P\ 8\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000400	.000250	.....	.....	
3,000	15,000	.000550	.000150	.....	.....	
4,000	20,000	.000700	.000150	.....	.....	
5,000	25,000	.000950	.000250	.000050	.000050	
5,200	26,000	.001000	.000050	.....	.....	Elastic limit.
5,400	27,000	.001150	.000150	.....	.....	
5,600	28,000	.001300	.000150	.....	.....	
5,800	29,000	.002400	.001100	.....	.....	
6,000	30,000	.002900	.000500	.....	.....	
6,200	31,000	.003850	.000950	.....	.....	
6,400	32,000	.004900	.001050	.....	.....	
6,600	33,000	.005600	.000700	.....	.....	
6,800	34,000	.006450	.000850	.....	.....	
7,000	35,000	.007250	.000800	.....	.....	
14,710	73,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,550
Elastic limit per square inch of original section	do...	26,000
Elongation per inch after rupture	inch..	.1950
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1" from neck
Character of broken surface		granular, silky spot at the circumference
Elongation of inch sections		".21*, ".18

PISTON RODS—6-POUNDER GUN MOUNTS

STEEL FORGINGS.

No. 6202.

Marks, $\frac{A\text{-}1}{PR\,6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.
Total.	Per square inch.				
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
200	1,000	0.	0.	0.	0.
1,000	5,000	.000100	.000100	0.	.....
2,000	10,000	.000250	.000150	.....	.....
4,000	20,000	.000600	.000350	.....	.....
6,000	30,000	.000950	.000350	.....	.....
8,000	40,000	.001300	.000350	0.	.....
10,200	51,000	.001600	.000300	.....	.....
11,000	55,000	.001650	.000050	.....	.....
12,000	60,000	.002000	.000350	.....	.....
12,800	64,000	.002650	.000650	.....	.....
13,000	65,000	.006650	.004000	.....	.....
13,200	66,000	.007000	.000350	.....	.....
13,400	67,000	.007300	.000300	.....	.....
13,600	68,000	.007600	.000300	.....	.....
13,800	69,000	.008250	.000650	.....	.....
14,000	70,000	.008500	.000250	.....	.....
16,310	81,550	.....	.....	.....	.....

General summary.

Tensile strength per square inch of original section	Pounds..
Elastic limit per square inch of original section	do...
Elongation per inch after rupture	inch..
Elongation per inch under strain at elastic limit	do...
Reduction in diameter at point of rupture	do...
Reduction in area after rupture, per cent of original section	
Position of rupture	middl
Character of broken surface	fine
Elongation of inch sections	″

No. 6198.

Marks, $\frac{A-2}{P\ R\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001300	.000300	0.	.....	
10,000	50,000	.001600	.000300	.....	.....	
12,000	60,000	.002000	.000400	.....	.....	
12,200	61,000	.002050	.000050	.....	.....	
12,400	62,000	.002100	.000050	.....	.....	Elastic limit.
12,600	63,000	.014000	.011900	.....	.....	
12,800	64,000	.014650	.000650	.....	.....	
13,000	65,000	.014900	.000250	.....	.....	
13,200	66,000	.015200	.000300	.....	.....	
13,400	67,000	.015850	.000650	.....	.....	
21,100	105,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,500
Elastic limit per square inch of original section	do...	62,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		1 ".06 from neck
Character of broken surface		fine granular radiating from the center
Elongation of inch sections		".11*, ".11

No. 6297.

Marks, $\frac{A\ 3}{P\ R\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001350	.000350	0.	.....	
10,000	50,000	.001700	.000350	.....	.....	
12,000	60,000	.002050	.000350	.....	.....	
13,000	65,000	.002300	.000250	.....	.....	Elastic limit.
13,200	66,000	.010650	.008350	.....	.....	
13,400	67,000	.011500	.000850	.....	.....	
13,600	68,000	.012100	.000600	.....	.....	
13,800	69,000	.012300	.000200	.....	.....	
14,000	70,000	.012600	.000300	.....	.....	
24,020	120,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	120,100
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	.0950
Elongation per inch under strain at elastic limit	do...	.002300
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		at middle of stem
Character of broken surface		fine granular, radiating from center punch mark defining inch section on stem.
Elongation of inch sections		″.10*, ″.09*

No. 6305.

Marks, $\frac{A\ 4}{P.R.6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001350	.000350	0.	.....	
8,200	41,000	.001400	.000050	.....	.....	
8,400	42,000	.001450	.000050	.....	.....	
8,600	43,000	.001550	.000100	.....	.....	
8,800	44,000	.001600	.000050	.....	.....	Elastic limit.
9,000	45,000	.006750	.005150	.....	.....	
9,200	46,000	.007250	.000500	.....	.....	
9,400	47,000	.007850	.000600	.....	.....	
9,600	48,000	.008300	.000450	.....	.....	
9,800	49,000	.009150	.000850	.....	.....	
20,200	101,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,000
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".5 from neck
Character of broken surface		fine granular, with a circle of coarser granulation ¼" diameter
Elongation of inch sections		".10 ".18

No. 6354.

Marks, $\frac{A\,6}{P\,R\,6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000250	.000200	.....	.....	
4,000	20,000	.000550	.000300	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
8,000	40,000	.001300	.000350	.....	.....	
9,000	45,000	.001550	.000250	.....	.....	Elastic limit.
9,200	46,000	.002250	.000700	.....	.....	
9,400	47,000	.002600	.000350	.....	.....	
9,600	48,000	.003150	.000550	.....	.....	
9,800	49,000	.003500	.000350	.....	.....	
10,000	50,000	.004050	.000550	.....	.....	
10,400	52,000	.004600	.000550	.....	.....	
10,800	54,000	.005550	.000950	.....	.....	
11,200	56,000	.006200	.000650	.....	.....	
11,600	58,000	.007450	.001250	.....	.....	
12,000	60,000	.008500	.001050	.....	.....	
22,810	114,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	114,050
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.1150
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".85 from neck
Character of broken surface		granular
Elongation of inch sections		".13*, ".10

No. 6367.

Marks, $\frac{A\ 7}{P\ R\ 6}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000650	.000800	.....	.....	
6,000	30,000	.001000	.000850	.....	.....	
8,000	40,000	.001400	.000400	0.	.....	
10,000	50,000	.001750	.000850	.....	.....	
11,000	55,000	.002000	.000250	.....	.....	
11,200	56,000	.002050	.000050	.....	.....	Elastic limit.
11,400	57,000	.008000	.005950	.....	.....	
11,600	58,000	.009150	.001150	.....	.....	
11,800	59,000	.010000	.000850	.....	.....	
12,000	60,000	.010500	.000500	.....	.....	
12,200	61,000	.011400	.000900	.....	.....	
23,410	117,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	117,050
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.1150
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.55 from neck
Character of broken surface		fine granular
Elongation of inch sections		″.14*. ″.09

No. 6257.

Marks, $\frac{A\text{-}12}{P\ R\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000900	.000300	.....	.....	
5,600	28,000	.001000	.000100	.....	.....	
5,800	29,000	.001050	.000050	.....	.....	Elastic limit.
6,000	30,000	.001500	.000450	.....	.....	
6,200	31,000	.003600	.002100	.....	.....	
6,400	32,000	.004950	.001350	.....	.....	
6,600	33,000	.005450	.000500	.....	.....	
6,800	34,000	.005900	.000450	.....	.....	
7,000	35,000	.006350	.000450	.....	.....	
7,200	36,000	.006850	.000500	.....	.....	
7,400	37,000	.007550	.000700	.....	.....	
7,600	38,000	.008000	.000450	.....	.....	
7,800	39,000	.008300	.000300	.....	.....	
8,000	40,000	.008600	.000300	.....	.....	
16,680	83,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,400
Elastic limit per square inch of original section	do...	29,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".8 from neck
Character of broken surface		fine granular
Elongation of inch sections		".10, ".12*

No. 6386.

Marks, $\frac{A\ 21}{P\ R\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000850	.000200	.....	.....	
6,000	30,000	.001000	.000150	0.	.....	
8,000	40,000	.001350	.000350	.....	.....	
9,000	45,000	.001550	.000200	.....	.....	
10,000	50,000	.001800	.000250	.....	.....	Elastic limit.
		.004750	.002950	.....	.....	
10,200	51,000	.006000	.001250	.....	.....	
10,400	52,000	.007400	.001400	.....	.....	
10,600	53,000	.007750	.000350	.....	.....	
10,800	54,000	.008350	.000600	.....	.....	
11,000	55,000	.009050	.000700	.....	.....	
19,980	99,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,900
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1".1 from neck
Character of broken surface		silky
Elongation of inch sections		".25*, ".17

No. 6387.

Marks, $\frac{A\ 22}{P\ R\ 6}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000600	.000200	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001400	.000400	.....	.....	
9,200	46,000	.001650	.000250	.....	.....	
9,400	47,000	.001700	.000050	.....	.....	
9,600	48,000	.001750	.000050	.....	.....	Elastic limit.
9,800	49,000	.004000	.002250	.....	.....	
10,000	50,000	.006900	.002900	.....	.....	
10,200	51,000	.007400	.000500	.....	.....	
10,400	52,000	.007850	.000450	.....	.....	
10,600	53,000	.008550	.000700	.....	.....	
10,800	54,000	.009000	.000450	.....	.....	
11,000	55,000	.009650	.000650	.....	.....	
19,710	98,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98,550
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.8
Position of rupture		".9 from neck
Character of broken surface		silky
Elongation of inch sections		".14, ".29*

AXLE, 6-POUNDER GUN MOUNT, STEEL FORGING.

No. 6175.

Marks, $\frac{A\text{-}1}{A\ 6.}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000650	.000350	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
7,000	35,000	.001200	.000200	.....	.....	
7,600	38,000	.....	.....	.....	.....	Elastic limit, approximate.
7,800	39,000	.010000	.008800	.....	.....	
8,000	40,000	.013600	.003600	.....	.....	
8,200	41,000	.013650	.000050	.....	.....	
8,400	42,000	.013700	.000050	.....	.....	
8,600	43,000	.013850	.000150	.....	.....	
8,800	44,000	.014150	.000300	.....	.....	
9,000	45,000	.014750	.000600	.....	.....	
15,480	77,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,400
Elastic limit per square inch of original section (approximate)	do...	38,000
Elongation per inch after rupture	inch..	.2750
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1".25 from neck
Character of broken surface		silky
Elongation of inch sections		".29*, ".26

PIVOT SOCKETS—15-POUNDER GUN MOUNTS.

STEEL CASTINGS.

No. 6172.

Marks, $\frac{A-1}{PS\ 15}$.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000400	.000150	0.	.....	
4,000	20,000	.000550	.000150	.....	.....	
4,200	21,000	.000650	.000100	.....	.....	
4,400	22,000	.000700	.000050	.....	.....	
4,600	23,000	.000800	.000100	.....	.....	
4,800	24,000	.000950	.000150	.....	.....	Elastic limit.
5,000	25,000	.001200	.000250	.....	.....	
5,200	26,000	.002000	.000800	.....	.....	
5,400	27,000	.004500	.002500	.....	.....	
5,600	28,000	.005700	.001200	.....	.....	
5,800	29,000	.007000	.001300	.....	.....	
6,000	30,000	.008000	.001000	.....	.....	
6,200	31,000	.009350	.001350	.....	.....	
11,680	58,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	58,400
Elastic limit per square inch of original section	do...	24,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.000950
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		1" from neck
Character of broken surface		granular, 60 per cent; dull silky, 40 per cent
Elongation of inch sections		".12, ".16*

No. 6174.

Marks, $\frac{A-2}{PS\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	.....	.....	
2,000	10,000	.000350	.000200	.....	.....	
3,000	15,000	.000600	.000250	.000100	.000100	
3,200	16,000	.000750	.000150	.....	.....	
3,400	17,000	.000950	.000200	.....	.....	
3,600	18,000	.001100	.000150	.....	.....	Elastic limit.
3,800	19,000	.001500	.000400	.....	.....	
4,000	20,000	.002350	.000850	.....	.....	
4,200	21,000	.003000	.000650	.....	.....	
4,400	22,000	.004000	.001000	.....	.....	
4,600	23,000	.005400	.001400	.....	.....	
4,800	24,000	.007000	.001600	.....	.....	
5,000	25,000	.008500	.001500	.....	.....	
6,640	33,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	33,200
Elastic limit per square inch of original section	do...	18,000
Elongation per inch after rupture	inch..	.0650
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.72 from neck
Character of broken surface		discolored, spongy
Elongation of inch sections		″.10*, ″.03

No. 6195.

Marks, $\overset{A-2}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000650	.000350	.....	.....	
4,600	23,000	.....	.....	.....	.....	Elastic limit, approximate.
6,000	30,000	.014000	.013350	.012900	.012900	
6,200	31,000	.016050	.002050	.....	.....	
6,400	32,000	.017250	.001200	.....	.....	
6,600	33,000	.019500	.002250	.....	.....	
6,800	34,000	.021000	.001500	.....	.....	
7,000	35,000	.023750	.002750	.....	.....	
10,820	54,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	54,100
Elastic limit per square inch of original section (approximate)	do...	28,000
Elongation per inch after rupture	inch..	.1150
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".6 from neck
Character of broken surface		coarse granular, 70 per cent; dull, silky, 30 per cent
Elongation of inch sections		".14", ".09

No. 6201.

Marks, $\frac{A\text{-}5}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000650	.000350	.....	.....	
4,400	22,000	.000750	.000100	.....	.....	
4,600	23,000	.000800	.000050	.....	.....	
4,800	24,000	.000850	.000050	.....	.....	Elastic limit.
5,000	25,000	.001300	.000450	.....	.....	
5,200	26,000	.003550	.002250	.....	.....	
5,400	27,000	.005000	.001450	.....	.....	
5,600	28,000	.006000	.001000	.....	.....	
5,800	29,000	.007350	.001350	.....	.....	
6,000	30,000	.008800	.001450	.....	.....	
11,670	58,350	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	58,350
Elastic limit per square inch of original section	do...	24,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		1″ from neck
Character of broken surface		dull gray, amorphous
Elongation of inch sections		″.17, ″.23*

No. 6280.

Marks, $\frac{A\ 11}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000750	.000150	.....	.....	
6,000	30,000	.000950	.000200	.0	.....	
7,000	35,000	.001150	.000200	.....	.....	
7,600	38,000	.001300	.000150	.....	.....	
7,800	39,000	.001350	.000050	.....	.....	Elastic limit.
8,000	40,000	.002000	.000650	.....	.....	
		.011000	.009000	.....	.....	
8,200	41,000	.012050	.001050	.....	.....	
8,400	42,000	.012950	.000900	.....	.....	
8,600	43,000	.014000	.001050	.....	.....	
8,800	44,000	.015000	.001000	.....	.....	
9,000	45,000	.016150	.001150	.....	.....	
15,010	75,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	75,050
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1750
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		″.9 from neck
Character of broken surface	granular 60 per cent, dull silky 40 per cent	
Elongation of inch sections		″.19*, ″.16

No. 6281.

Marks, $\frac{A\ 12}{P\ S\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
3,000	15,000	.000500	.000300	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000750	.000100	.....	.....	
6,000	30,000	.000950	.000200	0.	.....	
7,000	35,000	.001100	.000150	.....	.....	
7,600	38,000	.001200	.000100	.....	.....	Elastic limit.
7,800	39,000	.011000	.009800	.....	.....	
8,000	40,000	.012400	.001400	.....	.....	
8,200	41,000	.013000	.000600	.....	.....	
8,400	42,000	.014100	.001100	.....	.....	
8,600	43,000	.015250	.001150	.....	.....	
8,800	44,000	.016400	.001150	.....	.....	
9,000	45,000	.017500	.001100	.....	.....	
14,890	74,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	74,450
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		″.5 from neck
Character of broken surface		dull, amorphous
Elongation of inch sections		″.16, ″.25*

No. 6282.

Marks $\frac{A\ 13}{PS\ 15}$
Diameter ".505.
Sectional area .20 square inch.
Gauged length 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
3,000	15,000	.000450	.000250	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000750	.000150	.....	.....	
6,000	30,000	.001000	.000250	C.	.....	
6,800	34,000	.001200	.000200	.....	.....	Elastic limit.
7,000	35,000	.010500	.009300	.....	.....	
7,200	36,000	.011000	.000500	.....	.....	
7,400	37,000	.012000	.001000	.....	.....	
7,600	38,000	.013050	.001050	.....	.....	
7,800	39,000	.014050	.001000	.....	.....	
8,000	40,000	.015600	.001550	.....	.....	
13,100	65,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,500
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".45 from neck
Character of broken surface		granular 70 per cent, dull flaky 30 per cent
Elongation of inch sections		".10*, ".07

No. 6429.

Marks, $\frac{A\ 13}{2\ P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000500	.000250	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000900	.000250	.....	.....	
5,200	26,000	.001000	.000100	.....	.....	
5,400	27,000	.001000	0.	.....	.....	
5,600	28,000	.001100	.000100	.....	.....	
5,800	29,000	.001250	.000150	.....	.....	Elastic limit.
6,000	30,000	.002200	.000950	.....	.....	
6,200	31,000	.004050	.001850	.....	.....	
6,400	32,000	.007750	.003700	.....	.....	
6,600	33,000	.008250	.000500	.....	.....	
6,800	34,000	.009250	.001000	.....	.....	
7,000	35,000	.010200	.000950	.....	.....	
7,200	36,000	.011250	.001050	.....	.....	
7,400	37,000	.012500	.001250	.....	.....	
12,080	60,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	60,400
Elastic limit per square inch of original section	do...	29,000
Elongation per inch after rupture	inch..	.1250
Elongation per inch under strain at elastic limit	do...	.001250
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		at middle of stem
Character of broken surface		granular 50 per cent, silky 50 per cent
Elongation of inch sections		".08, ".17*

No. 6283.

Marks, $\frac{A-14}{P\ S-15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000850	.000100	.....	.....	
4,000	20,000	.000550	.000200	.....	.....	
5,000	25,000	.000650	.000100	.....	.....	
6,000	30,000	.000650	.000200	0.	.....	
6,800	34,000	.001100	.000250	.....	.....	Elastic limit.
7,000	35,000	.010500	.009400	.....	.....	
7,200	36,000	.011250	.000750	.....	.....	
7,400	37,000	.013000	.001750	.....	.....	
7,600	38,000	.013250	.000250	.....	.....	
7,800	39,000	.014050	.000800	.....	.....	
8,000	40,000	.015000	.000950	.....	.....	
14,210	71,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	71,050
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		1" from neck
Character of broken surface		dull silky
Elongation of inch sections		".25*, ".17

No. 6284.

Marks, $\frac{A-15}{P\ S\ 15}$
Diameter, ".496.
Sectional area, .1932 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
193	1,000	0.	0.	0.	0.	Initial load.
966	5,000	.000100	.000100	0.	.....	
1,932	10,000	.000300	.000200	.....	.....	
2,898	15,000	.000500	.000200	.....	.....	
3,864	20,000	.000650	.000150	.....	.....	
4,830	25,000	.000850	.000200	.....	.....	
5,796	30,000	.001000	.000150	0.	.....	
6,762	35,000	.001150	.000150	.....	.....	Elastic limit.
		.009500	.008350	.....	.....	
6,955	36,000	.010000	.000500	.....	.....	
7,148	37,000	.010500	.000500	.....	.....	
7,342	38,000	.012000	.001500	.....	.....	
7,535	39,000	.013450	.001450	.....	.....	
7,728	40,000	.015000	.001550	.....	.....	
13,910	72,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,000
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.076
Reduction in area after rupture, per cent of original section		28.3
Position of rupture		".96 from neck
Character of broken surface		dull silky
Elongation of inch sections		".26*, ".19

No. 6341.

Marks, $\frac{A\ 16}{PS\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000500	.000250	.....	.....	
4,000	20,000	.000600	.000100	.....	.....	
5,000	25,000	.000800	.000200	.....	.....	
6,000	30,000	.001050	.000250	.....	.....	
6,800	34,000	.001250	.000200	.....	.....	Elastic limit.
7,000	35,000	.002000	.000750	.....	.....	
7,200	36,000	.008600	.006600	.....	.....	
7,400	37,000	.009900	.001300	.....	.....	
7,600	38,000	.010550	.000650	.....	.....	
7,800	39,000	.011750	.001200	.....	.....	
8,000	40,000	.013250	.001500	.....	.....	
14,420	72,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,100
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	.2350
Elongation per inch under strain at elastic limit	do...	.001250
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1".13 from neck
Character of broken surface		dull silky
Elongation of inch sections		".28*, ".19

No. 6432.

Marks, $\frac{A\ 17}{P\ S\ 15}$
Diameter, .″501.
Sectional area, .197 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
197	1,000	0.	0.	0.	0.	Initial load.
985	5,000	.000100	.000100	0.	.....	
1,970	10,000	.000200	.000100	.....	.....	
2,955	15,000	.000400	.000200	.....	.....	
3,940	20,000	.000550	.000150	.....	.....	
4,925	25,000	.000750	.000200	.....	.....	
5,910	30,000	.001000	.000250	.....	.....	
6,107	31,000	.001050	.000050	.....	.....	Elastic limit.
6,304	32,000	.007000	.005950	.....	.....	
6,501	33,000	.008150	.001150	.....	.....	
6,698	34,000	.009500	.001350	.....	.....	
6,895	35,000	.011000	.001500	.....	.....	
7,092	36,000	.011900	.000900	.....	.....	
7,289	37,000	.012500	.000600	.....	.....	
7,486	38,000	.013500	.001000	.....	.....	
7,683	39,000	.014850	.001350	.....	.....	
7,880	40,000	.016500	.001650	.....	.....	
13,890	70,510	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70,510
Elastic limit per square inch of original section	do...	31,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.081
Reduction in area after rupture, per cent of original section		29.7
Position of ruputre		at middle of stem
Character of broken surface		dull silky 70 per cent, granular 30 per cent
Elongation of inch sections		″.24*, ″.24*

No. 6343.

Marks, $\frac{A\ 18}{P\ 8\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000400	.000150	.....	.....	
4,000	20,000	.000600	.000200	.....	.....	
5,000	25,000	.000800	.000200	.....	.....	
6,000	30,000	.001000	.000200	.....	.....	
6,600	33,000	.001150	.000150	.....	.....	Elastic limit.
6,800	34,000	.001300	.000150	.....	.....	
7,000	35,000	.010500	.009200	.....	.....	
7,200	36,000	.011450	.000950	.....	.....	
7,400	37,000	.012500	.001050	.....	.....	
7,600	38,000	.013600	.001100	.....	.....	
7,800	39,000	.014650	.001050	.....	.....	
8,000	40,000	.016750	.002100	.....	.....	
13,810	69,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	69,050
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		at middle of stem
Character of broken surface		dull silky, serrated
Elongation of inch sections		$\frac{.25}{.28}$*

No. 6344.

Marks, $\frac{A\ 19}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000500	.000200	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000950	.000300	.....	.....	
5,200	26,000	.001000	.000050	.....	.....	
5,400	27,000	.001100	.000100	.....	.....	Elastic limit.
5,600	28,000	.001300	.000200	.....	.....	
5,800	29,000	.001800	.000500	.....	.....	
6,000	30,000	.002500	.000700	.....	.....	
6,200	31,000	.004750	.002250	.....	.....	
6,400	32,000	.006050	.001300	.....	.....	
6,600	33,000	.007100	.001050	.....	.....	
6,800	34,000	.008600	.001500	.....	.....	
7,000	35,000	.009500	.000900	.....	.....	
13,300	66,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	66,500
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.2700
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		".65 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".22, ".32*

No. 6345.

Marks, $\frac{A\ 20}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000400	.000150	.....	.....	
4,000	20,000	.000600	.000200	.....	.....	
4,400	22,000	.000700	.000100	.....	.....	
4,600	23,000	.000750	.000050	.....	.....	
4,800	24,000	.000800	.000050	.....	.....	Elastic limit.
5,000	25,000	.001150	.000350	.....	.....	
5,200	26,000	.001800	.000650	.....	.....	
5,400	27,000	.002400	.000600	.....	.....	
5,600	28,000	.003050	.000650	.....	.....	
5,800	29,000	.003950	.000900	.....	.....	
6,000	30,000	.005000	.001050	.....	.....	
6,200	31,000	.005700	.000700	.....	.....	
6,400	32,000	.007050	.001350	.....	.....	
6,600	33,000	.008000	.000950	.....	.....	
6,800	34,000	.009050	.001050	.....	.....	
7,000	35,000	.010000	.000950	.....	.....	
12,880	64,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	64,400
Elastic limit per square inch of original section	do...	24,000
Elongation per inch after rupture	inch..	.2800
Elongation per inch under strain at elastic limit	do...	.000800
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		1".1 from neck
Character of broken surface		dull amorphous, 70 per cent; granular, 30 per cent
Elongation of inch sections		".21, ".25*

No. 6346.

Marks, $\frac{A\ 21}{P\ 8\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000750	.000150	.....	.....	
5,200	26,000	.001000	.000250	.....	.....	Elastic limit.
5,400	27,000	.001350	.000350	.....	.....	
5,600	28,000	.002050	.000700	.....	.....	
5,800	29,000	.002850	.000800	.....	.....	
6,000	30,000	.004100	.001250	.....	.....	
6,200	31,000	.004900	.000800	.....	.....	
6,400	32,000	.006000	.001100	.....	.....	
6,600	33,000	.007000	.001000	.....	.....	
6,800	34,000	.008150	.001150	.....	.....	
7,000	35,000	.009500	.001350	.....	.....	
13,320	66,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	66,600
Elastic limit per square inch of original section	do...	26,000
Elongation per inch after rupture	inch..	″.2750
Elongation per inch under strain at elastic limit	do...	″.001000
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		″.8 from neck
Character of broken surface		dull, silky, oblique
Elongation of inch sections		″.21, ″.34[a]

No. 6347.

Marks, $\frac{A\ 22}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000400	.000150	.....	.....	
4,000	20,000	.000600	.000200	.....	.....	
4,800	24,000	.000750	.000150	.....	.....	Elastic limit, not well defined.
5,000	25,000	.000900	.000150	.....	.....	
5,200	26,000	.001000	.000100	.....	.....	
5,400	27,000	.001100	.000100	.....	.....	
5,600	28,000	.001200	.000100	.....	.....	
5,800	29,000	.001450	.000250	.....	.....	
6,000	30,000	.001850	.000400	.....	.....	
6,200	31,000	.002500	.000650	.....	.....	
6,400	32,000	.003600	.001100	.....	.....	
6,600	33,000	.004550	.000950	.....	.....	
6,800	34,000	.005650	.001100	.....	.....	
7,000	35,000	.006550	.000900	.....	.....	
13,770	68,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	68,850
Elastic limit per square inch of original section, not well defined	do...	24,000
Elongation per inch after rupture	inch..	.2600
Elongation per inch under strain at elastic limit	do...	.000750
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		".7 from neck
Character of broken surface		dull silky
Elongation of inch sections		".84", ".13

No. 6359.

Marks, $\frac{A\ 23}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5.000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
3,600	18,000	.000550	.000100	.....	.....	
3,800	19,000	.000650	.000100	.....	.....	Elastic limit.
4,000	20,000	.000850	.000200	.....	.....	
4,200	21,000	.001900	.000050	.....	.....	
4,400	22,000	.002600	.000700	.....	.....	
4,600	23,000	.003750	.001150	.....	.....	
4,800	24,000	.004650	.000900	.....	.....	
5,000	25,000	.005900	.001250	.....	.....	
5,200	26,000	.007000	.001100	.....	.....	
5,400	27,000	.008400	.001400	.....	.....	
5,600	28,000	.009550	.001150	.....	.....	
5,800	29,000	.011500	.001950	.....	.....	
6,000	30,000	.012650	.001150	.....	.....	
11,610	58,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	58,050
Elastic limit per square inch of original section	do...	19,000
Elongation per inch after rupture	inch..	.3250
Elongation per inch under strain at elastic limit	do...	.000650
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".2 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".28, ".37

No. 6430.

Marks, $\frac{A\ 23}{2\ P.S.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
3,000	15,000	.000500	.000300	.....	.....	
3,200	16,000	.000550	.000050	.....	.....	
3,400	17,000	.000650	.000100	.....	.....	
3,600	18,000	.000800	.000150	.....	.....	Elastic limit.
3,800	19,000	.001500	.000700	.....	.....	
4,000	20,000	.001700	.000200	.....	.....	
4,200	21,000	.002150	.000450	.....	.....	
4,400	22,000	.003000	.000850	.....	.....	
4,600	23,000	.003950	.000950	.....	.....	
4,800	24,000	.005000	.001050	.....	.....	
5,000	25,000	.006250	.001250	.....	.....	
5,200	26,000	.007150	.000900	.....	.....	
5,400	27,000	.008500	.001350	.....	.....	
5,600	28,000	.010000	.001500	.....	.....	
5,800	29,000	.011250	.001250	.....	.....	
10,850	54,250	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of orginal section	pounds..	54,250
Elastic limit per square inch of original section	do...	18,000
Elongation per inch after rupture	inch..	.1350
Elongation per inch under strain at elastic limit	do...	.000800
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".50 from neck
Character of broken surface		granular, spongy spot at the circumference
Elongation of inch sections		".17*, ".10

No. 6360.

Marks, $\frac{A\ 24}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000450	.000100	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000850	.000250	.....	.....	
5,200	26,000	.000900	.000050	.....	.....	
5,400	27,000	.001000	.000100	.....	.....	Elastic limit.
5,600	28,000	.001300	.000300	.....	.....	
5,800	29,000	.001500	.000200	.....	.....	
6,000	30,000	.001800	.000300	.....	.....	
6,200	31,000	.002050	.000250	.....	.....	
6,400	32,000	.002850	.000800	.....	.....	
6,600	33,000	.003300	.000450	.....	.....	
6,800	34,000	.004050	.000750	.....	.....	
7,000	35,000	.005000	.000950	.....	.....	
14,600	73,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,000
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		80.7
Position of rupture		".96 from neck
Character of broken surface		dull, amorphous, oblique
Elongation of inch sections		".19, ".29*

No. 6361.

Marks, $\frac{A\ 25}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000650	.000200	.....	.....	
4,200	21,000	.000700	.000050	.....	.....	
4,400	22,000	.000800	.000100	.....	.....	Elastic limit, not well defined.
4,600	23,000	.001000	.000200	.....	.....	
4,800	24,000	.001100	.000100	.....	.....	
5,000	25,000	.001200	.000100	.....	.....	
5,200	26,000	.001500	.000300	.....	.....	
5,400	27,000	.001850	.000350	.....	.....	
5,600	28,000	.002400	.000550	.....	.....	
5,800	29,000	.003050	.000650	.....	.....	
6,000	30,000	.003900	.000850	.....	.....	
13,110	65,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,550
Elastic limit per square inch of original section, not well defined	do...	22,000
Elongation per inch after rupture	inch..	.1300
Elongation per inch under strain at elastic limit	do...	.000800
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		".45 from neck
Character of broken surface		granular, 55 per cent; silky center, 45 per cent
Elongation of inch sections		".11, ".15*

No. 6433.

Marks, $\frac{A\ 25}{2\ P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000250	.000100	.....	.....	
3,000	15,000	.000500	.000250	.....	.....	
4,000	20,000	.000850	.000350	.....	.....	
4,200	21,000	.000950	.000100	.....	.....	
4,400	22,000	.001050	.000100	.....	.....	
4,600	23,000	.001150	.000100	.....	.....	Elastic limit.
4,800	24,000	.001650	.000500	.....	.....	
5,000	25,000	.002000	.000350	.....	.....	
5,200	26,000	.002950	.000950	.....	.....	
5,400	27,000	.008250	.000900	.....	.....	
5,600	28,000	.004000	.000750	.....	.....	
5,800	29,000	.005000	.001000	.....	.....	
6,000	30,000	.006000	.001000	.....	.....	
6,200	31,000	.006950	.000950	.....	.....	
6,400	32,000	.007850	.000900	.....	.....	
6,600	33,000	.009000	.001150	.....	.....	
11,380	56,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,900
Elastic limit per square inch of original section	do...	23,000
Elongation per inch after rupture	inch..	.0600
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		at the neck
Character of broken surface		granular, spongy spot at circumference
Elongation of inch sections		".06, ".06

No. 6362.

Marks, $\frac{A\ 26}{P\ S\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000500	.000200	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000900	.000250	.....	.....	
5,600	28,000	.001050	.000150	.....	.....	Elastic limit.
5,800	29,000	.001200	.000150	.....	.....	
6,000	30,000	.001500	.000300	.....	.....	
6,200	31,000	.001750	.000250	.....	.....	
6,400	32,000	.002050	.000300	.....	.....	
6,600	33,000	.002500	.000450	.....	.....	
6,800	34,000	.003350	.000850	.....	.....	
7,000	35,000	.004000	.000650	.....	.....	
13,190	65,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,950
Elastic limit per square inch of original section	do...	28,000
Elongation per inch after rupture	inch....	.0650
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section	do...	5.7
Position of rupture		".2 from neck
Character of broken surface		medium coarse, granular
Elongation of inch sections		".05*, ".06

No. 6425.

Marks, $\frac{A\ 27}{2\ PS.\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
5,000	25,000	.000900	.000300	.....	.....	
6,000	30,000	.001050	.000150	.....	.....	
6,600	33,000	.001150	.000100	.....	.....	Elastic limit.
6,800	34,000	.001300	.000150	.....	.....	
		.009000	.007700	.....	.....	
7,000	35,000	.010600	.001300	.....	.....	
7,200	36,000	.011000	.000700	.....	.....	
7,400	37,000	.012100	.001100	.....	.....	
7,600	38,000	.013150	.001050	.....	.....	
7,800	39,000	.014500	.001350	.....	.....	
8,000	40,000	.016250	.001750	.....	.....	
13,100	65,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,500
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.60 from neck
Character of broken surface		granular 85 per cent, dull silky 15 per cent
Elongation of inch sections		″.12⁸, ″.10

No. 6389.

Marks, $\frac{A\ 28}{P.S.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.001050	.000400	.....	.....	
5,200	26,000	.001150	.000100	.....	.....	
5,400	27,000	.001250	.000100	.....	.....	Elastic limit.
5,600	28,000	.001550	.000300	.....	.....	
5,800	29,000	.002000	.000450	.....	.....	
6,000	30,000	.002450	.000450	.....	.....	
6,200	31,000	.003000	.000550	.....	.....	
6,400	32,000	.004000	.001000	.....	.....	
6,600	33,000	.004850	.000850	.....	.....	
6,800	34,000	.005900	.001050	.....	.....	
7,000	35,000	.007100	.001200	.....	.....	
7,200	36,000	.008000	.000900	.....	.....	
7,400	37,000	.009000	.001000	.....	.....	
7,600	38,000	.010200	.001200	.....	.....	
7,800	39,000	.011500	.001300	.....	.....	
8,000	40,000	.012750	.001250	.....	.....	
13,090	65,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,450
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001250
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		".7 from neck
Character of broken surface		granular, with silky metal intermingled
Elongation of inch sections		".09, ".13*

No. 6425.

Marks, $\frac{A\ 27}{2\ PS.\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
5,000	25,000	.000900	.000300	.....	.....	
6,000	30,000	.001050	.000150	.....	.....	
6,600	33,000	.001150	.000100	.....	.....	Elastic limit.
6,800	34,000	.001300	.000150	.....	.....	
		.009000	.007700	.....	.....	
7,000	35,000	.010800	.001800	.....	.....	
7,200	36,000	.011000	.000700	.....	.....	
7,400	37,000	.012100	.001100	.....	.....	
7,600	38,000	.013150	.001050	.....	.....	
7,800	39,000	.014500	.001350	.....	.....	
8,000	40,000	.016250	.001750	.....	.....	
13,100	65,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,500
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.60 from neck
Character of broken surface		granular 85 per cent, dull silky 15 per cent
Elongation of inch sections		″.12*, ″.10

No. 6389.

Marks, $\frac{A\ 28}{P.\ S.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000350	.000250			
3,000	15,000	.000500	.000150			
4,000	20,000	.000650	.000150			
5,000	25,000	.001050	.000400			
5,200	26,000	.001150	.000100			
5,400	27,000	.001250	.000100			Elastic limit.
5,600	28,000	.001550	.000300			
5,800	29,000	.002000	.000450			
6,000	30,000	.002450	.000450			
6,200	31,000	.003000	.000550			
6,400	32,000	.004000	.001000			
6,600	33,000	.004850	.000850			
6,800	34,000	.005900	.001050			
7,000	35,000	.007100	.001200			
7,200	36,000	.008000	.000900			
7,400	37,000	.009000	.001000			
7,600	38,000	.010200	.001200			
7,800	39,000	.011500	.001300			
8,000	40,000	.012750	.001250			
13,090	65,450					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,450
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001250
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		".7 from neck
Character of broken surface		granular, with silky metal intermingled
Elongation of inch sections		".09, ".13*

No. 6426.

Marks, $\frac{A\ 28}{2\ P\ S\ 15}$
Diameter, ″.505
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
5,000	25,000	.000700	.000150	.....	.....	
6,000	30,000	.001000	.000300	.....	.....	
6,200	31,000	.001050	.000050	.....	.....	
6,400	32,000	.001100	.000050	.....	.....	Elastic limit.
6,600	33,000	.007500	.006400	.....	.....	
6,800	34,000	.008900	.001400	.....	.....	
7,000	35,000	.010500	.001600	.....	.....	
13,690	68,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	68,450
Elastic limit per square inch of original section	do...	32,000
Elongation per inch after rupture	inch..	.1450
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.05 from neck
Character of broken surface		granular, flaky spot at the circumference
Elongation of inch sections		″.14, ″.15*

No. 6427.

Marks, $\frac{A\ 29}{P.\ S.\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
5,000	25,000	.000900	.000250	.....	.....	
5,600	28,000	.001050	.000150	.....	.....	Elastic limit.
5,800	29,000	.004550	.003500	.....	.....	
6,000	30,000	.006500	.001950	.....	.....	
6,200	31,000	.007500	.001000	.....	.....	
6,400	32,000	.008250	.000750	.....	.....	
6,600	33,000	.009500	.001250	.....	.....	
6,800	34,000	.010250	.000750	.....	.....	
7,000	35,000	.011500	.001250	.....	.....	
13,760	68,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	68,800
Elastic limit per square inch of original section	do...	28,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		″.65 from neck
Character of broken surface		granular, silky spot at the circumference
Elongation of inch sections		″.24*, ″.16

No. 6428.

Marks, $\frac{A\ 30}{P.\ S.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,600	18,000	.000600	.000250	.....	.....	
3,800	19,000	.000700	.000100	.....	.....	Elastic limit.
4,000	20,000	.001600	.000900	.....	.....	
4,200	21,000	.002400	.000800	.....	.....	
4,400	22,000	.003300	.000900	.....	.....	
4,600	23,000	.004500	.001200	.....	.....	
4,800	24,000	.006050	.001550	.....	.....	
5,000	25,000	.007750	.001700	.....	.....	
5,200	26,000	.009500	.001750	.....	.....	
5,400	27,000	.012000	.002500	.....	.....	
5,600	28,000	.015500	.003500	.....	.....	
5,740	28,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	28,700
Elastic limit per square inch of original section	do...	19,000
Elongation per inch after rupture	inch..	.0350
Elongation per inch under strain at elastic limit	do...	.000700
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		".75 from neck
Character of broken surface		dull amorphous, granular and spongy parts. Fractured in two places.
Elongation of inch sections		".06*, ".01

No. 6436.

Marks, $\frac{A\ 81}{P.S.15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000650	.000250	.....	.....	
3,000	15,000	.000550	.000200	.....	.....	
4,000	20,000	.000900	.000850	.....	.....	
4,200	21,000	.000950	.000050	.....	.....	
4,400	22,000	.001000	.000050	.....	.....	Elastic limit.
4,600	23,000	.001700	.000700	.....	.....	
4,800	24,000	.002000	.000300	.....	.....	
5,000	25,000	.003000	.001000	.....	.....	
5,200	26,000	.003550	.000550	.....	.....	
5,400	27,000	.004500	.000950	.....	.....	
5,600	28,000	.006000	.001500	.....	.....	
5,800	29,000	.009000	.003000	.....	.....	
6,000	30,000	.011750	.002750	.....	.....	
6,200	31,000	.016250	.004500	.....	.....	
6,360	31,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	31,800
Elastic limit per square inch of original section	do...	22,000
Elongation per inch after rupture	inch..	.0200
Elongation per inch under strain at elastic limit	do...	.001000
Position of rupture		in threaded end
Character of broken surface		fine granular 25 per cent, spongy 75 per cent. Opened crack in surface of stem.
Elongation of inch sections		″.02, ″.02

No. 6432.

Marks, $\frac{A\ 82}{P.\ S.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000300	.000150	.....	.....	
3,000	15,000	.000500	.000200	.....	.....	
4,000	20,000	.000700	.000200	.....	.....	
5,000	25,000	.000850	.000150	.....	.....	
6,000	30,000	.001000	.000150	.....	.....	
6,200	31,000	.001000	0.	.....	.....	
6,400	32,000	.001050	.000050	.....	.....	
6,600	33,000	.001100	.000050	.....	.....	
6,800	34,000	.001150	.000050	.....	.....	Elastic limit.
7,000	35,000	.013200	.002050	.....	.....	
7,200	36,000	.013250	.000050	.....	.....	
7,400	37,000	.013500	.000250	.....	.....	
7,600	38,000	.014500	.001000	.....	.....	
7,800	39,000	.015500	.001000	.....	.....	
8,000	40,000	.017150	.001650	.....	.....	
8,200	41,000	.018100	.000950	.....	.....	
8,400	42,000	.019750	.001650	.....	.....	
8,600	43,000	.021050	.001300	.....	.....	
8,800	44,000	.022500	.001450	.....	.....	
13,990	69,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	69,950
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	2.200
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		340
Position of rupture		".40 from neck
Character of broken surface		dull silky; traces of granulation
Elongation of inch sections		".16, ".28*

INNER BASES—15-POUNDER GUN MOUNTS.

STEEL CASTINGS.

No. 6199.

Marks, $\frac{A\text{-}1}{I\text{-}B\text{-}15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
3,000	15,000	.000400	.000200	.....	.....	
4,000	20,000	.000600	.000200	.....	.....	
5,000	25,000	.000800	.000200	.....	.....	
6,000	30,000	.001050	.000250	.000050	.000050	
6,600	33,000	.001200	.000150	.....	.....	Elastic limit.
6,800	34,000	.001450	.000250	.....	.....	
7,000	35,000	.002150	.000700	.....	.....	
7,200	36,000	.002800	.000650	.....	.....	
7,400	37,000	.003600	.000800	.....	.....	
7,600	38,000	.004500	.000900	.....	.....	
7,800	39,000	.005050	.000550	.....	.....	
8,000	40,000	.006000	.000950	.....	.....	
16,380	81,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,900
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		18.2
Position of rupture		″.95 from neck
Character of broken surface		granular, varying from coarse to fine
Elongation of inch sections		″.10, ″.12*

No. 6169.

Marks, $\frac{A\text{-}2}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	
1,000	5,000	0.	0.	0.	.....	Initial load.
2,000	10,000	.000250	.000250	.000250	.000250	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.008000	.007400	.007900	.007650	
6,200	31,000	.009350	.001350	.....	.....	
6,400	32,000	.010300	.000950	.....	.....	
6,600	33,000	.012000	.001700	.....	.....	
6,800	34,000	.013150	.001150	.....	.....	
7,000	35,000	.014750	.001600	.....	.....	
11,680	58,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	58,400
Elastic limit per square inch of original section	pounds	below 30,000
Elongation per inch after rupture	inch	.1500
Reduction in diameter at point of rupture	do	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".85 from neck
Character of broken surface		dull silky; trace of granulation
Elongation of inch sections		".19", ".11

No. 6395.

Marks, $\frac{A\,2}{2\,I\,B\,15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
4,600	23,000	.000800	.000200	.....	.....	
4,800	24,000	.000850	.000050	.....	.....	Elastic limit.
5,000	25,000	.003600	.002750	.....	.....	
5,200	26,000	.004500	.000900	.....	.....	
5,400	27,000	.005750	.001250	.....	.....	
5,600	28,000	.007000	.001250	.....	.....	
5,800	29,000	.008250	.001250	.....	.....	
6,000	30,000	.009400	.001150	.....	.....	
6,400	32,000	.011750	.002350	.....	.....	
6,800	34,000	.015000	.003250	.....	.....	
7,200	36,000	.018050	.003050	.....	.....	
7,600	38,000	.021500	.003450	.....	.....	
8,000	40,000	.025400	.003900	.....	.....	
8,400	42,000	.029500	.004100	.....	.....	
8,800	44,000	.035000	.005500	.....	.....	
9,200	46,000	.040000	.005000	.....	.....	
9,600	48,000	.046000	.006000	.....	.....	
10,000	50,000	.054000	.008000	.....	.....	
10,400	52,000	.063500	.009500	.....	.....	
10,800	54,000	.074000	.010500	.....	.....	
11,510	57,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	57,550
Elastic limit per square inch of original section	do...	24,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		″.8 from neck
Character of broken surface		dull amorphous; opened cracks along surface of stem
Elongation of inch sections		″.17*, ″.11

No. 6270.

Marks, $\frac{A\ 5}{1\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
3,000	15,000	.000450	.000250	.....	.....	
4,000	20,000	.000550	.000100	0.	.....	
5,000	25,000	.000700	.000150	.....	.....	
6,000	30,000	.001000	.000300	.000050	.000050	Elastic limit.
6,200	31,000	.013000	.012000	.....	.....	
6,400	32,000	.013750	.000750	.....	.....	
6,600	33,000	.015000	.001250	.....	.....	
6,800	34,000	.016400	.001400	.....	.....	
7,000	35,000	.018000	.001600	.....	.....	
12,200	61,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	61,000
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.1750
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		″.75 from neck
Character of broken surface		dull gray, amorphous, spongy streak across center
Elongation of inch sections		″.15, ″.20*

No. 6200.

Marks, $\frac{A\ 6}{I\text{-}B\text{-}15}$
Diameter, ″.505
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000550	.000300	.....	.....	
6,000	30,000	.000950	.000400	0.	.....	Elastic limit.
6,200	31,000	.009000	.008050	.....	.....	
6,400	32,000	.013500	.004500	.....	.....	
6,600	33,000	.014750	.001250	.....	.....	
6,800	34,000	.016000	.001250	.....	.....	
7,000	35,000	.018000	.002000	.....	.....	
11,210	56,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,050
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.1200
Elongation per inch under strain at elastic limit	do...	.000950
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		1″. from neck
Character of broken surface		dull silky, oblique. Opened cracks in surface of stem
Elongation of inch sections		″.09, ″.15

No. 6421.

Marks, $\frac{A\ 6}{2\ I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000700	.000100	.....	.....	
5,400	27,000	.000850	.000150	.....	.....	Elastic limit.
5,600	28,000	.004000	.003150	.....	.....	
5,800	29,000	.007000	.003000	.....	.....	
6,000	30,000	.009000	.002000	.....	.....	
6,200	31,000	.010250	.001250	.....	.....	
6,400	32,000	.012500	.002250	.....	.....	
6,600	33,000	.013550	.001050	.....	.....	
6,800	34,000	.015200	.001650	.....	.....	
7,000	35,000	.017000	.001800	.....	.....	
10,810	54,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	54,050
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.1250
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		″.3 from neck
Character of broken surface		dull amorphous; opened cracks along the stem
Elongation of inch sections		″.11, ″.14*

No. 6422.

Marks, $\frac{A\ 8}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000200	.000150	.....	.....	
3,000	15,000	.000850	.000150	.....	.....	
4,000	20,000	.000700	.000850	.....	.....	Elastic limit.
4,200	21,000	.000850	.000150	.....	.....	
4,400	22,000	.001650	.000800	.....	.....	
4,600	23,000	.002850	.001200	.....	.....	
4,800	24,000	.003750	.000900	.....	.....	
5,000	25,000	.004600	.000850	.....	.....	
5,200	26,000	.005550	.000950	.....	.....	
5,400	27,000	.007000	.001450	.....	.....	
5,600	28,000	.008250	.001250	.....	.....	
5,800	29,000	.009900	.001650	.....	.....	
6,000	30,000	.011250	.001350	.....	.....	
11,280	56,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,400
Elastic limit per square inch of original section	do...	20,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.000700
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		1".1 from neck
Character of broken surface		dull amorphous
Elongation of inch sections		".19, ".23*

No. 6196.

Marks, $\frac{A\ 9}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000250	.000200	.....	.....	
4,000	20,000	.000800	.000850	.....	.....	
4,200	21,000	.000850	.000050	.....	.....	
4,400	22,000	.000750	.000100	.....	.....	Elastic limit.
4,600	23,000	.000950	.000200	.....	.....	
4,800	24,000	.001550	.000600	.....	.....	
5,000	25,000	.003250	.001700	.....	.....	
5,200	26,000	.005000	.001750	.....	.....	
5,400	27,000	.006000	.001000	.....	.....	
5,600	28,000	.007500	.001500	.....	.....	
5,800	29,000	.008250	.000750	.....	.....	
6,000	30,000	.010000	.001750	.008850	.008850	
6,200	31,000	.011500	.001500	.....	.....	
6,400	32,000	.012450	.000950	.....	.....	
6,600	33,000	.014150	.001700	.....	.....	
6,800	34,000	.016050	.001900	.....	.....	
7,000	35,000	.017550	.001500	.....	.....	
11,300	56,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,500
Elastic limit per square inch of original section	do...	22,000
Elongation per inch after rupture	inch..	.1350
Elongation per inch under strain at elastic limit	do...	.000750
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		″.4 from neck
Character of broken surface		dull silky
Elongation of inch sections		″.18ᵇ, ″.09

No. 6197.

Marks, $\frac{A\ 10}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	Elastic limit.
4,200	21,000	.000850	.000200	.....	.....	
4,400	22,000	.001000	.000150	.....	.....	
4,600	23,000	.001200	.000200	.....	.....	
4,800	24,000	.001600	.000400	.....	.....	
5,000	25,000	.002100	.000500	.....	.....	
5,200	26,000	.003500	.001400	.....	.....	
5,400	27,000	.005750	.002250	.....	.....	
5,600	28,000	.007400	.001650	.....	.....	
5,800	29,000	.009000	.001600	.....	.....	
6,000	30,000	.010100	.001100	.009000	.009000	
6,200	31,000	.011250	.001150	.....	.....	
6,400	32,000	.013100	.001850	.....	.....	
6,600	33,000	.014500	.001400	.....	.....	
6,800	34,000	.016050	.001550	.....	.....	
7,000	35,000	.018400	.002350	.....	.....	
11,390	56,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,950
Elastic limit per square inch of original section	do...	20,000
Elongation per inch after rupture	inch..	.1650
Elongation per inch under strain at elastic limit	do...	.000650
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		".5 from neck
Character of broken surface		dull silky
Elongation of inch sections		".12, ".21*

No. 6423.

Marks, $\frac{A\ 10.}{2\ I\ B\ 15.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15.000	.000500	.000150	.....	.....	
4,000	20,000	.000750	.000250	.....	.....	
4,200	21,000	.000800	.000050	.....	.....	
4,400	22,000	.000850	.000050	.....	.....	Elastic limit.
4,600	23,000	.001350	.000500	.....	.....	
4,800	24,000	.002000	.000650	.....	.....	
5,000	25,000	.002950	.000950	.....	.....	
5,200	26,000	.004100	.001150	.....	.....	
5,400	27,000	.005400	.001300	.....	.....	
5,600	28,000	.006600	.001200	.....	.....	
5,800	29,000	.007950	.001350	.....	.....	
6,000	30,000	.009500	.001550	.....	.....	
10,710	53,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	53,550
Elastic limit per square inch of original section	do...	22,000
Elongation per inch after rupture	inch..	.1150
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		″.95 from neck
Character of broken surface.... granular, 40 per cent; dull amorphous, 60 per cent. Contains a seam		
Elongation of inch sections		″.13*, ″.10

No. 6271.

Marks, $\frac{A\ 11}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000350	.000350	.000300	.000300	Elastic limit.
4,200	21,000	.002100	.001250	.....	.....	
4,400	22,000	.003150	.001050	.....	.....	
4,600	23,000	.004500	.001350	.....	.....	
4,800	24,000	.005500	.001000	.....	.....	
5,000	25,000	.006900	.001400	.....	.....	
5,200	26,000	.008100	.001200	.....	.....	
5,400	27,000	.009550	.001450	.....	.....	
5,600	28,000	.011000	.001450	.....	.....	
5,800	29,000	.012600	.001600	.....	.....	
6,000	30,000	.014500	.001900	.....	.....	
11,170	55,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	55,850
Elastic limit per square inch of original section	do...	20,000
Elongation per inch after rupture	inch..	.2950
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1".00 from neck
Character of broken surface		dull silky
Elongation of inch sections		".36*, ".23

No. 6272.

Marks, $\frac{A\ 12}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000600	.000100	0.	.....	
5,000	25,000	.000850	.000250	.....	.....	
5,600	28,000	.001050	.000200	.....	.....	Elastic limit.
5,800	29,000	.004500	.003450	.....	.....	
6,000	30,000	.005500	.001000	.....	.....	
6,200	31,000	.006450	.000950	.....	.....	
6,400	32,000	.007600	.001150	.....	.....	
6,600	33,000	.008850	.001250	.....	.....	
6,800	34,000	.010000	.001150	.....	.....	
7,000	35,000	.010850	.000850	.....	.....	
13,080	65,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,400
Elastic limit per square inch of original section	do...	28,000
Elongation per inch after rupture	inch..	.1300
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.35 from neck
Character of broken surface		granular, silky spot at the circumference
Elongation of inch sections		″.14*. ″.12

No. 6424.

Marks, $\frac{A\ 13}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000900	.000250	.....	.....	
5,400	27,000	.001000	.000100	.....	.....	Elastic limit.
5,600	28,000	.002150	.001150	.....	.....	
5,800	29,000	.004100	.001950	.....	.....	
6,000	30,000	.008000	.003900	.....	.....	
6,200	31,000	.009900	.001900	.....	.....	
6,400	32,000	.011050	.001150	.....	.....	
6,600	33,000	.012000	.000950	.....	.....	
6,800	34,000	.014150	.002150	.....	.....	
7,000	35,000	.015000	.000850	.....	.....	
12,320	61,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	61,600
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.1650
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		″.1 from neck
Character of broken surface		dull amorphous; seam at the circumference
Elongation of inch sections		″.20*, ″.13

No. 6396.

Marks, $\frac{A\ 14}{2\ I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000850	.000200	.....	.....	
3,000	15,000	.000550	.000200	.....	.....	
4,000	20,000	.000750	.000200	.....	.....	
4,400	22,000	.000900	.000150	.....	.....	
4,600	23,000	.000950	.000050	.....	.....	Elastic limit.
4,800	24,000	.001450	.000500	.....	.....	
5,000	25,000	.004400	.002950	.....	.....	
5,200	26,000	.005450	.001050	.....	.....	
5,400	27,000	.006750	.001300	.....	.....	
5,600	28,000	.008350	.001600	.....	.....	
5,800	29,000	.009950	.001600	.....	.....	
6,000	30,000	.011100	.001150	.....	.....	
6,400	32,000	.014000	.002900	.....	.....	
6,800	34,000	.017000	.003000	.....	.....	
7,200	36,000	.020000	.003000	.....	.....	
7,600	38,000	.023750	.003750	.....	.....	
8,000	40,000	.028000	.004250	.....	.....	
8,400	42,000	.032500	.004500	.....	.....	
8,800	44,000	.037100	.004600	.....	.....	
9,200	46,000	.043250	.006150	.....	.....	
9,600	48,000	.049500	.006250	.....	.....	
10,000	50,000	.057000	.007500	.....	.....	
12,020	60,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	60,100
Elastic limit per square inch of original section	do...	23,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.000960
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		".75 from neck
Character of broken surface		dull amorphous, oblique
Elongation of inch sections		".25*, ".16

No. 6273.

Marks, $\frac{A\ 15}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000350	.000200	.....	.....	
3,000	15,000	.000550	.000200	.....	.....	
4,000	20,000	.000800	.000250	.000050	.000050	
5,000	25,000	.001050	.000250	.....	.....	Elastic limit.
5,200	26,000	.002000	.000950	.....	.....	
5,400	27,000	.004000	.002000	.....	.....	
5,600	28,000	.008000	.004000	.....	.....	
5,800	29,000	.010750	.002750	.....	.....	
6,000	30,000	.011750	.001000	.....	.....	
9,480	47,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	47,400
Elastic limit per square inch of original section	do...	25,000
Elongation per inch after rupture	inch..	.0800
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".25 from neck
Character of broken surface		dull amorphous, 60 per cent; granular 40 per cent
Elongation of inch sections		".05, ".13*

No. 6278.

Marks, $\frac{A\text{-}15}{I\text{-}B\text{-}15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000600	.000150	0.	.....	
5,000	25,000	.000850	.000250	.....	.....	
5,800	29,000	.001000	.000150	.....	.....	Elastic limit.
6,000	30,000	.001500	.000500	.....	.....	
6,200	31,000	.006100	.006600	.....	.....	
6,400	32,000	.009400	.001300	.....	.....	
6,600	33,000	.010550	.001150	.....	.....	
6,800	34,000	.011550	.001000	.....	.....	
7,000	35,000	.012500	.000950	.....	.....	
13,530	67,650	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	67,650
Elastic limit per square inch of original section	do...	29,000
Elongation per inch after rupture	inch..	.2450
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		1″.05 from neck
Character of broken surface		silky, 50 per cent; granular, 50 per cent
Elongation of inch sections		″.25*, ″.24

No. 6279.

Marks, $\frac{A-16}{I-B-15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000600	.000150	0.	.....	
5,000	25,000	.000800	.000200	.....	.....	
5,800	29,000	.000950	.000150	.....	.....	Elastic limit.
6,000	30,000	.012500	.011550	.....	.....	
6,200	31,000	.014250	.001750	.....	.....	
6,400	32,000	.015500	.001250	.....	.....	
6,600	33,000	.017000	.001500	.....	.....	
6,800	34,000	.018300	.001300	.....	.....	
7,000	35,000	.020000	.001700	.....	.....	
12,280	61,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	61,400
Elastic limit per square inch of original section	do...	29,000
Elongation per inch after rupture	inch..	.3050
Elongation per inch under strain at elastic limit	do...	.000950
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.31*, ″.30*

No. 6274.

Marks, $\frac{A-17}{I-B-15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch,*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000600	.000100	0.	.....	
5,000	25,000	.000900	.000300	.....	.....	
6,000	30,000	.001050	.000150	.000050	.000050	Elastic limit.
6,200	31,000	.006000	.004950	.....	.....	
6,400	32,000	.013750	.007750	.....	.....	
6,600	33,000	.014550	.000800	.....	.....	
6,800	34,000	.015650	.001100	.....	.....	
7,000	35,000	.017750	.002100	.....	.....	
11,740	58,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	58,700
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		″.5 from neck
Character of broken surface		dull amorphous, oblique surface
Elongation of inch sections		″.20*, ″.10

No. 6320.

Marks, $\frac{A\ 15}{I.\ B.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
3,000	15,000	.000400	.000200	.....	.....	
4,000	20,000	.000600	.000200	.....	.....	
6,000	30,000	.000950	.000350	.000050	.000050	
7,400	37,000	.001150	.000200	.....	.....	Elastic limit.
7,600	38,000	.013500	.002350	.....	.....	
7,800	39,000	.015350	.001850	.....	.....	
8,000	40,000	.017000	.001650	.....	.....	
8,200	41,000	.018000	.001000	.....	.....	
8,400	42,000	.019500	.001500	.....	.....	
14,020	70,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70,100
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		at middle of stem
Character of broken surface		dull silky
Elongation of inch sections		".22*, ".18

No. 6321.

Marks, $\frac{A\ 19}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
3,000	15,000	.000500	.000200	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000850	.000200	.....	.....	
6,000	30,000	.001000	.000150	0.	.....	
7,000	35,000	.001200	.000200	.....	.....	Elastic limit.
7,200	36,000	.011000	.009800	.....	.....	
7,400	37,000	.012000	.001000	.....	.....	
7,600	38,000	.012750	.000750	.....	.....	
7,800	39,000	.013500	.000750	.....	.....	
8,000	40,000	.014650	.001150	.....	.....	
14,510	72,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,550
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		1".1 from neck
Character of broken surface		granular 40 per cent, dull amorphous 60 per cent
Elongation of inch sections		".21, ".20*

N. 6322.

Marks, $\frac{A\ 20}{I.\ B.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000650	.000200	.....	.....	
5,000	25,000	.000900	.000250	.....	.....	
5,200	26,000	.000950	.000050	.....	.....	
5,400	27,000	.001050	.000100	.....	.....	Elastic limit.
5,600	28,000	.001550	.000500	.....	.....	
5,800	29,000	.003000	.001450	.....	.....	
6,000	30,000	.004050	.001050	.....	.....	
6,200	31,000	.005050	.001000	.....	.....	
6,400	32,000	.006000	.000950	.....	.....	
14,100	70,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70,500
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".95 from neck
Character of broken surface		granular
Elongation of inch sections		.23*, ."23

No. 6335.

Marks, $\frac{A\ 21.}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000550	.000100	.....	.....	
5,000	25,000	.000900	.000350	.....	.....	
5,200	26,000	.001000	.000100	.....	.....	Elastic limit.
5,400	27,000	.001450	.000450	.....	.....	
5,600	28,000	.002750	.001300	.....	.....	
5,800	29,000	.004250	.001500	.....	.....	
6,000	30,000	.005600	.001350	.....	.....	
13,110	65,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,550
Elastic limit per square inch of original section	do...	26,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		1".1 from neck
Character of broken surface		granular, interspersed with dull amorphous metal
Elongation of inch sections		".26*, ".20

No. 6348.

Marks, $\frac{A\ 22}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000650	.000200	.....	.....	
4,200	21,000	.000750	.000100	.....	.....	Elastic limit.
4,400	22,000	.001050	.000300	.....	.....	
4,600	23,000	.001500	.000450	.....	.....	
4,800	24,000	.002150	.000650	.....	.....	
5,000	25,000	.003400	.001250	.....	.....	
5,200	26,000	.004550	.001150	.....	.....	
5,400	27,000	.005800	.001250	.....	.....	
5,600	28,000	.007350	.001550	.....	.....	
5,800	29,000	.008500	.001150	.....	.....	
6,000	30,000	.009150	.000650	.....	.....	
12,520	62,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	62,600
Elastic limit per square inch of original section	do...	21,000
Elongation per inch after rupture	inch..	.3250
Elongation per inch under strain at elastic limit	do...	.000750
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.23, ″.42*

No. 6363.

Marks, $\frac{A\ 23}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000450	.000100	.....	.....	
4,000	20,000	.000550	.000100	.....	.....	
4,600	23,000	.000700	.000150	.....	.....	
4,800	24,000	.000800	.000100	.....	.....	Elastic limit.
5,000	25,000	.001100	.000300	.....	.....	
5,200	26,000	.001500	.000400	.....	.....	
5,400	27,000	.001800	.000300	.....	.....	
5,600	28,000	.002400	.000600	.....	.....	
5,800	29,000	.003600	.001200	.....	.....	
6,000	30,000	.004600	.001000	.....	.....	
13,390	66,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	66,950
Elastic limit per square inch of original section	do...	24,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.000800
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		".8 from neck
Character of broken surface		granular, dull, silky spot at the circumference
Elongation of inch sections		".17, ".23*

No. 6364.

Marks, $\frac{A\ 24}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000700	.000250	.....	.....	
4,400	22,000	.000800	.000100	.....	.....	Elastic limit.
4,600	23,000	.001100	.000300	.....	.....	
4,800	24,000	.001450	.000350	.....	.....	
5,000	25,000	.001850	.000400	.....	.....	
5,200	26,000	.002250	.000400	.....	.....	
5,400	27,000	.008050	.000800	.....	.....	
5,600	28,000	.008800	.000750	.....	.....	
5,800	29,000	.004750	.000950	.....	.....	
6,000	30,000	.005650	.000900	.....	.....	
13,260	66,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	66,300
Elastic limit per square inch of original section	do...	22,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.000800
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		″.8 from neck
Character of broken surface		granular 40 per cent, silky 60 per cent
Elongation of inch sections		″.16, ″.29*

No. 6431.

Marks, $\frac{A\ 25}{I\ B\ 15}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000500	.000250	.....	.....	
4,000	20,000	.000700	.000200	.....	.....	
5,000	25,000	.000850	.000150	.....	.....	
6,000	30,000	.001000	.000150	.....	.....	
6,200	31,000	.001100	.000100	.....	.....	
6,400	32,000	.001100	0.	.....	.....	Elastic limit.
6,600	33,000	.010100	.009000	.....	.....	
6,800	34,000	.010500	.000400	.....	.....	
7,000	35,000	.011650	.001150	.....	.....	
7,200	36,000	.012650	.001000	.....	.....	
7,400	37,000	.013500	.000850	.....	.....	
7,600	38,000	.015400	.001900	.....	.....	
7,800	39,000	.016500	.001100	.....	.....	
8,000	40,000	.019250	.002750	.....	.....	
8,200	41,000	.019500	.000250	.....	.....	
8,400	42,000	.021000	.001500	.....	.....	
13,590	67,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	67,950
Elastic limit per square inch of original section	do...	32,000
Elongation per inch after rupture	inch..	.2850
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		″.75 from neck
Character of broken surface		dull silky 90 per cent, granular 10 per cent
Elongation of inch sections		″.19, ″.28*

No. 6437.

Marks, $\frac{A\ 27}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000850	.000250	.....	.....	
6,000	30,000	.001000	.000150	.....	.....	Elastic limit.
6,200	31,000	.009650	.008650	.....	.....	
6,400	32,000	.010350	.000700	.....	.....	
6,600	33,000	.011000	.000650	.....	.....	
6,800	34,000	.012200	.001200	.....	.....	
7,000	35,000	.013400	.001200	.....	.....	
7,200	36,000	.014500	.001100	.....	.....	
7,400	37,000	.016000	.001500	.....	.....	
7,600	38,000	.017500	.001500	.....	.....	
7,800	39,000	.018750	.001250	.....	.....	
8,000	40,000	.021700	.002950	.....	.....	
8,200	41,000	.022250	.000550	.....	.....	
13,190	65,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,950
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch...	.3000
Elongation per inch under strain at elastic limit	do....	.001000
Reduction in diameter at point of rupture	do....	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".50 from neck
Character of broken surface		silky
Elongation of inch sections		".25, .35*

No. 6435.

Marks, $\frac{A\ 28}{I\ B\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15.000	.000450	.000150	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000750	.000150	.....	.....	
6,000	30,000	.001050	.000300	.....	.....	Elastic limit.
6,200	31,000	.009200	.008150	.....	.....	
6,400	32,000	.009650	.000450	.....	.....	
6,600	33,000	.011150	.001500	.....	.....	
6,800	34,000	.012500	.001350	.....	.....	
7,000	35,000	.013250	.000750	.....	.....	
7,200	36,000	.015000	.001750	.....	.....	
7,400	37,000	.016250	.001250	.....	.....	
7,600	38,000	.017650	.001400	.....	.....	
7,800	39,000	.019000	.001350	.....	.....	
8,000	40,000	.020500	.001500	.....	.....	
8,200	41,000	.022250	.001750	.....	.....	
13,090	65,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	65,450
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.3250
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1".20 from neck
Character of broken surface		dull silky
Elongation of inch sections		".38*, ".27

PISTON RODS—15-POUNDER GUN MOUNTS.

STEEL FORGINGS.

No. 6176.

Marks, $\frac{A\text{-}1}{P\ R\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000550	.000300	.....	.....	
6,000	30,000	.000950	.000400	0.	.....	
8,000	40,000	.001300	.000350	.....	.....	
8,200	41,000	.001300	0.	.....	.....	
8,400	42,000	.001400	.000100	.....	.....	
8,600	43,000	.001450	.000050	.....	.....	
8,800	44,000	.001500	.000050	.....	.....	
9,000	45,000	.001500	0.	.....	.....	
9,200	46,000	.001500	0.	.....	.....	
9,400	47,000	.001500	0.	.....	.....	
9,600	48,000	.001500	0.	.....	.....	
9,800	49,000	.001600	.000100	.....	.....	
10,000	50,000	.001600	0.	.....	.....	
10,200	51,000	.001650	.000050	.....	.....	
10,400	52,000	.001700	.000050	.....	.....	
10,600	53,000	.001700	0.	.....	.....	
10,800	54,000	.001750	.000050	.....	.....	Elastic limit.
11,000	55,000	.009100	.007350	.....	.....	
11,200	56,000	.009350	.000250	.....	.....	
11,400	57,000	.009750	.000400	.....	.....	
11,600	58,000	.010250	.000500	.....	.....	
11,800	59,000	.010600	.000350	.....	.....	
12,000	60,000	.011300	.000700	.....	.....	
21,790	108,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,950
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		28.9
Position of rupture		".88 from neck
Character of broken surface		fine granular
Elongation of inch sections		".19*, ".09

No. 6177.

Marks, $\frac{A\text{-}2}{P.\ R.\ 15}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000200	.000050	.....	.....	
4,000	20,000	.000600	.000400	.....	.....	
6,000	30,000	.000950	.000850	0.	.....	
8,000	40,000	.001300	.000850	.....	.....	
8,200	41,000	.001350	.000050	.....	.....	
8,400	42,000	.001400	.000050	.....	.....	
8,600	43,000	.001450	.000050	.....	.....	
8,800	44,000	.001500	.000050	.....	.....	
9,000	45,000	.001500	0.	.....	.....	
9,200	46,000	.001500	0.	.....	.....	
9,400	47,000	.001550	.000050	.....	.....	Elastic limit.
9,600	48,000	.006250	.004700	.....	.....	
9,800	49,000	.006550	.000300	.....	.....	
10,000	50,000	.007000	.000450	.....	.....	
10,200	51,000	.007400	.000400	.....	.....	
10,400	52,000	.007750	.000350	.....	.....	
10,600	53,000	.008250	.000500	.....	.....	
21,390	106,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	106,950
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1550
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		28.9
Position of rupture		".52 from neck
Character of broken surface		fine granular, silky center
Elongation of inch sections		".10, ".21*

No. 6173.

Marks, $\frac{A\text{-}3}{P\ R\ 15}$.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000200	.000150	.....	.....	
4,000	20,000	.000550	.000350	.....	.....	
6,000	30,000	.000950	.000400	0.	.....	
8,000	40,000	.001250	.000300	0.	.....	
9,000	45,000	.001500	.000250	.....	.....	
9,200	46,000	.001500	0.	.....	.....	
9,400	47,000	.001500	0.	.....	.....	
9,600	48,000	.001550	.000050	.....	.....	
9,800	49,000	.001600	.000050	.....	.....	
10,000	50,000	.001600	0.	.....	.....	
10,200	51,000	.001700	.000100	.....	.....	
10,400	52,000	.001700	0.	.....	.....	Elastic limit.
10,600	53,000	.006750	.004050	.....	.....	
10,800	54,000	.006000	.000250	.....	.....	
11,000	55,000	.006250	.000250	.....	.....	
11,200	56,000	.006550	.000300	.....	.....	
11,400	57,000	.007050	.000500	.....	.....	
11,600	58,000	.007600	.000550	.....	.....	
22,490	112,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,450
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.1200
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		at middle of stem
Character of broken surface		fine granular
Elongation of inch sections		.13*, .11

No. 6171.

Marks, $\frac{A-4.}{P\ R\ 15.}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000300	.000150	.....	.....	
4,000	20,000	.000650	.000350	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
8,000	40,000	.001350	.000350	.....	.....	
9,000	45,000	.001550	.000200	.....	.....	
9,200	46,000	.001600	.000050	.....	.....	
9,400	47,000	.001650	.000050	.....	.....	
9,600	48,000	.001650	0.	.....	.....	
9,800	49,000	.001650	0.	.....	.....	
10,000	50,000	.001700	.000050	.....	.....	
10,200	51,000	.001750	.000050	.....	.....	Elastic limit.
10,400	52,000	.008450	.006700	.....	.....	
10,600	53,000	.008500	.000050	.....	.....	
10,800	54,000	.008500	0.	.....	.....	
11,000	55,000	.008600	.000100	.....	.....	
11,200	56,000	.008750	.000150	.....	.....	
11,400	57,000	.009000	.000250	.....	.....	
22,290	111,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	111,450
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.1950
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		″.55 from neck
Character of broken surface		fine granular
Elongation of inch sections		″.21*, ″.18

TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2″ LONG).

PIVOT SOCKETS, 6-POUNDER GUN MOUNTS. STEEL CASTINGS.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per squ're inch.	Elongation in 2 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		″	″
6170	A 2 P S 6	.505	.20	*a* 20,000	54,450	13.5	16.9	Granular, dark spot at circumference.	.12,	.15*
6219	A 6 P S 6	.505	.20	21,000	58,200	30.0	40.3	Dull silky	.32*,	.28*
6220	A 7 P S 6	.505	.20	19,000	57,800	26.0	37.1	.....do	.21,	.31*
6221	A 8 P S 6	.505	.20	43,000	99,600	11.0	9.5	Granular, dull spot at circumference; opened cracks in surface of stem	.11*,	.11
6222	A 9 P S 6	.505	.20	20,000	60,150	22.5	27.4	Dull amorphous	.25*,	.20
6223	A 10 P S 6	.505	.20	21,000	99,900	21.0	20.5	Dull, silky; trace of granulation	.18,	.24*
6224	A 11 P S 6	.505	.20	20,000	60,550	24.0	30.7	Dull amorphous	.20,	.28*
6225	A 12 P S 6	.505	.20	20,000	59,850	21.5	27.4	.....do	.18,	.25*
6237	A 13 P S 6	.505	.20	25,000	55,400	35.0	54.6	Silky	.42*,	.28
6238	A 14 P S 6	.505	.20	33,000	59,550	35.0	59.8	.....do	.31,	.39*
6239	A 15 P S 6	.505	.20	31,000	66,100	25.5	34.0	Silky, oblique	.30*,	.21
6240	A 16 P S 6	.505	.20	27,000	54,600	37.0	57.2	Silky	.31,	.43*
6241	A 17 P S 6	.505	.20	31,000	60,900	21.5	27.4	Dull gray, amorphous	.17,	.26*
6242	A 18 P S 6	.505	.20	30,000	61,050	21.0	23.9	.....do	.19,	.23*
6275	A 19 P S 6	.505	.20	35,000	70,500	22.5	30.7	Silky, serrated	.25*,	.20
6276	A 20 P S 6	.505	.20	39,000	74,250	17.0	20.5	Granular 60 per cent, silky 40 per cent	.19*	.15
6298	A 21 P S 6	.505	.20	*b* 25,000	67,200	30.0	43.3	Dull silky	.28,	.32*
6299	A 22 P S 6	.505	.20	26,000	73,550	19.5	40.3	Granular, silky spot at circumference	.21*.	.18

a Below. *b* About.

TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2″ LONG)—Continued.

PISTON RODS, 6-POUNDER GUN MOUNTS. STEEL FORGINGS.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per squ're inch.	Elongation in 2 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		″ ″
6202	A 1 P R 6	.505	.20	64,000	81,550	10.0	13.2	Fine granular	.10*, .10*
6198	A 2 P R 6	.505	.20	62,000	105,500	11.0	13.2	Fine granular, radiating from the center	.11*, .11
6297	A 3 P R 6	.505	.20	65,000	120,100	9.5	13.2	Fine granular, radiating from center punch defining inch section on stem	.10*, .09*
6305	A 4 P R 6	.505	.20	44,000	101,000	14.0	20.5	Fine granular, with a circle of coarser granulation ¼″ diameter	.10, .18*
6334	A 5 P R 6	.505	.20	60,000	119,000	9.5	13.2	Fine granular	.08, .11*
6354	A 6 P R 6	.505	.20	45,000	114,050	11.5	16.9	Granular	.13*, .10
6367	A 7 P R 6	.505	.20	56,000	117,050	11.5	13.2	Fine granular	.14*, .09
6257	A 12 P R 6	.505	.25	29,000	83,400	11.0	16.9	.....do	.10, .12*
6386	A 21 P R 6	.505	.25	50,000	99,900	21.0	37.1	Silky	.25*, .17
6387	A 22 P R 6	.505	.25	48,000	98,550	21.5	40.3	.....do	.14, .29*

AXLE 6-POUNDER GUN MOUNT. STEEL FORGING.

6175	A 1 A 6	.505	.20	a 38,000	77,400	.....	49.1	Silky	.29*, .26

PIVOT SOCKETS, 15-POUNDER GUN MOUNTS. STEEL CASTINGS.

6172	A 1 P S 15	.505	.20	24,000	58,400	14.0	16.9	Granular 60 per cent, dull silky 40 per cent	.12, .16*
6174	A 2 P S 15	.505	.20	18,000	33,200	6.5	9.5	Discolored, spongy	.10*, .05
6195	A 2 P S 15	.505	.20	a 23,000	54,100	11.5	16.9	Coarse granular 70 per cent, dull silky 30 per cent	.14*, .09

6201	A 5 P S 15	.505	.20	24,000	[8,350	20.0	27.4	Dull gray, amorphous	.17, .23*
6280	A 11 P S 15	.505	.20	39,000	75,050	17.5	20.5	Granular 60 per cent, dull silky 40 per cent	.19*, .16
6281	A 12 P S 15	.505	.20	38,000	74,450	20.5	27.4	Dull amorphous	.16, .25*
6282	A 13 P S 15	.505	.20	34,000	65,500	8.5	9.5	Granular 70 per cent, dull flaky 30 per cent	.10, .07
6429	A 13 2 P S 15	.505	.20	29,000	60,400	12.5	13.2	Granular 50 per cent, silky 50 per cent	.08, .17*
6283	A 14 P S 15	.505	.20	34,000	71,050	21.0	30.7	Dull silky	.25*, .17
6284	A 15 P S 15	.496	.1982	35,000	72,000	22.5	28.3	.....do	.26*, .19
6341	A 16 P S 15	.505	.20	34,000	72,100	23.5	37.1	.....do	.28*, .19
6342	A 17 P S 15	.501	.197	31,000	70,510	24.0	29.7	Dull silky 70 per cent, granular 30 per cent	.24*, .24*
6343	A 18 P S 15	.505	.20	33,000	69,050	23.0	27.4	Dull silky, serrated	.25*, .28*
6344	A 19 P S 15	.505	.20	27,000	66,500	27.0	37.1	Silky, oblique	.22, .32*
6345	A 20 P S 15	.505	.20	24,000	64,400	23.0	27.4	Dull amorphous 70 per cent, granular 30 per cent	.21, .25*
6346	A 21 P S 15	.505	.20	26,000	66,600	27.5	37.1	Dull silky, oblique	.21, .34*
6347	A 22 P S 15	.505	.20	24,000	68,850	26.0	40.3	Dull silky	.34*, .18
6359	A 23 P S 15	.505	.20	19,000	58,050	32.5	40.3	Silky, oblique	.28, .37*
6430	A 23 2 P S 15	.505	.20	18,000	54,250	13.5	16.9	Granular, spongy spot at circumference	.17*, .10
6360	A 24 P S 15	.505	.20	27,000	73,000	24.0	30.7	Dull amorphous, oblique	.19, .29*
6361	A 25 P S 15	.505	.20	22,000	65,550	13.0	16.9	Granular 55 per cent, silky center 45 per cent	.11, .15*
6433	A 25 2 P S 15	.505	.20	23,000	56,900	6.0	5.7	Granular, spongy spot at circumference	.06, .06
6362	A 26 P S 15	.505	.20	28,000	65,950	5.5	5.7	Medium coarse granular	.05*, .06
6434	A 26 2 P S 15	.505	.20	28,000	67,400	8.0	9.5	Granular	.10*, .06
6388	A 27 P S 15	.505	.20	27,000	65,100	10.0	9.5	Granular 85 per cent, dull silky 15 per cent	.11*, .09
6425	A 27 2 P S 15	.505	.20	33,000	65,500	11.0	13.2	.....do	.12*, .10
6389	A 28 P S 15	.505	.20	27,000	65,450	11.0	13.2	Granular, with silky metal intermingled	.09, .13*
6426	A 28 2 P S 15	.505	.20	32,000	68,450	14.5	13.2	Granular, flaky spot at circumference	.14, .15*

a About.

TABULATION OF STEEL SPECIMENS FROM 6-POUNDER AND 15-POUNDER GUN MOUNTS (STEMS 2″ LONG)—Continued.

PIVOT SOCKETS, 15-POUNDER GUN MOUNTS. STEEL CASTINGS—Continued.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per squ're inch.	Elongation in 2 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		″	″
6427	A 29 P S 15	.505	.20	28,000	68,800	20.0	20.5	Granular, silky spot at circumference	.24*	.16
6428	A 30 P S 15	.505	.20	19,000	28,700	3.5	5.7	Dull amorphous, granular and spongy parts. Fractured in two places	.06*	.01
6436	A 31 P S 15	.505	.20	22,000	31,800	2.0	.....	Fine granular 25 per cent, spongy 75 per cent. Opened cracks in surface of stem. Fractured in threaded end.	.02,	.02
6432	A 32 P S 15	.505	.20	34,000	69,950	22.0	34.0	Dull silky; traces of granulation	.16,	.28*

INNER BASES, 15-POUNDER GUN MOUNTS. STEEL CASTINGS.

6199	A 1 I B 15	.505	.20	33,000	81,900	11.0	13.2	Granular, varying from coarse to fine	.10,	.12*
6169	A 2 I B 15	.505	.20	a 30,000	58,400	15.0	20.5	Dull silky; trace of granulation	.19*	.11
6395	A 2 2 I B 15	.505	.20	24,000	57,550	14.0	27.4	Dull amorphous; opened cracks in surface of stem	.17*	.11
6270	A 5 I B 15	.505	.20	30,000	61,000	17.5	27.4	Dull gray amorphous, spongy streak across center	.15,	.20*
6200	A 6 I B 15	.505	.20	30,000	56,050	12.0	16.9	Dull silky oblique; opened cracks in surface of stem	.09,	.15*
6421	A 6 2 I B 15	.505	.20	27,000	54,050	12.5	20.5	Dull amorphous; opened cracks along the stem	.11,	.14*
6422	A 8 I B 15	.505	.20	20,000	56,400	21.0	23.9	Dull amorphous	.19,	.23*
6196	A 9 I B 15	.505	.20	22,000	56,500	13.5	20.5	Dull silky	.18*	.09
6197	A 10 I B 15	.505	.20	20,000	56,950	16.5	27.4	.....do	.12,	.21*
6423	A 10 2 I B 15	.505	.20	22,000	53,550	11.5	16.9	Granular 40 per cent, dull amorphous 60 per cent; contains a seam	.13*	.10
6271	A 11 I B 15	.505	.20	20,000	55,850	29.5	37.1	Dull silky	.36*	.23
6272	A 12 I B 15	.505	.20	28,000	65,400	13.0	13.2	Granular, silky spot at circumference	.14*	.12
6424	A 13 I B 15	.505	.20	27,000	61,600	16.5	27.4	Dull amorphous seam at circumference	.20*	.13

6396	A 14 2 I B 15	.505	.20	23,000	60,100	20.5	27.4	Dull amorphous, oblique	.25*, .16
6273	A 15 I B 15	.505	.20	25,000	47,400	9.0	20.5	Dull amorphous 60 per cent, granular 40 per cent	.05, .13*
6278	A 15 I B 15	.505	.20	29,000	67,650	24.5	27.4	Silky 50 per cent, granular 50 per cent	.25*, .24
6279	A 16 I B 15	.505	.20	29,000	61,400	30.5	43.3	Silky	.31*, .30*
6274	A 17 I B 15	.505	.20	30,000	58,700	15.0	23.9	Dull amorphous, oblique surface	.20*, .10
6320	A 18 I B 15	.505	.20	37,000	70,100	20.0	23.9	Dull silky	.22*, .18
6321	A 19 I B 15	.505	.20	35,000	72,550	20.5	27.4	Granular 40 per cent, dull amorphous 60 per cent	.21, .20*
6322	A 20 I B 15	.505	.20	27,000	70,500	23.0	20.5	Granular	.23, .23*
6335	A 21 I B 15	.505	.20	26,000	65,550	23.0	23.9	Granular, interspersed with dull amorphous metal	.26*, .20
6348	A 22 I B 15	.505	.20	21,000	62,600	32.5	49.1	Silky	.23, .42*
6363	A 23 I B 15	.505	.20	24,000	66,950	20.0	23.9	Granular, dull silky spot at the circumference	.17, .23*
6364	A 24 I B 15	.505	.20	22,000	66,300	22.5	30.7	Granular 40 per cent, silky 60 per cent	.16, .29*
6431	A 25 I B 15	.505	.20	32,000	67,950	23.5	23.9	Dull silky 90 per cent, granular 10 per cent	.19, .28*
6437	A 27 I B 15	.505	.20	30,000	65,950	30.0	40.3	Silky	.25, .35*
6435	A 28 I B 15	.505	.20	30,000	65,450	32.5	49.1	Dull silky	.38*, .27

PISTON RODS, 15-POUNDER GUN MOUNTS. STEEL FORGINGS.

6176	A 1 P R 15	.505	.20	54,000	108,950	14.0	23.9	Fine granular	.19*, .09
6177	A 2 P R 15	.505	.20	47,000	106,950	15.5	23.9	Fine granular, silky center	.10, .21*
6173	A 3 P R 15	.505	.20	52,000	112,450	12.0	16.9	Fine granular	.13*, .11
6171	A 4 P R 15	.505	.20	51,000	111,450	19.5	23.9	.....do	.21* .18

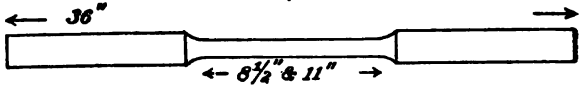
a Below.

SPECIMENS FROM GUN LEVER AXLES FOR 12-INCH DISAPPEARING CARRIAGE.

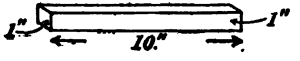
No. of test.	Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
			Total.	Per square inch.	Total.	Per square inch.						
	Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*In. Sq. in.*	*Per ct.*		" " "
9537	.564	.25	10,300	41,200	22,410	89,640	.37	12.3	Diam. .54=.229	8.4	Granular, medium coarse	.09, .11, .17*
9561	.564	.25	12,000	48,000	26,600	106,400	.24	8.0	Diam. .54=.229	8.4	.....do	.07, .07, .10*

ANCHOR BOLTS FOR 12-INCH GUN CARRIAGES.

Tension specimens.



Bending specimens.



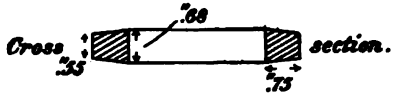
No. of test.	Description.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 8 and 10 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	Bending tests.
		Inches.	*Sq. inches.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*			
9538	2-inch bolt for 12-inch barbette carriage.	1.129	1.00	30,580	54,620	30.4	55.8	Silky	".21, ".23, ".23, ".23, .26, .29, .53*, 57*, .28, .21.	Bent cold 180 degrees, and closed down upon itself without fracture.
9653	2¼-inch bolt for 12-inch disappearing carriage.	1.153	1.044	26,240	58,260	31.6	46.9	.....do	".21, ".25, ".29, "49*, ".55*, ".29, .24, .21.	Bent cold 180 degrees, and closed down upon itself without fracture on the tension side.

PROOF STRESS APPLIED TO PISTON RODS FOR GUN CARRIAGES.

Description.	Total length.	Diameters.			Tensile stress applied.
		Maximum.	Minimum.	Root of thread.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Pounds.*
6″ disappearing carriage	119.25	2.50	2.125	2.015	40,000
8″ disappearing carriage	172.75	3.50	3.00	2.89	90,000
10″ disappearing carriage	181.50	3.50	3.00	2.87	125,000
12″ disappearing carriage	220.00	4.75	4.25	2.83	150,000

COMPRESSION TESTS OF HELICAL SPRINGS FOR 7-INCH MORTAR CARRIAGES. MODEL 1895.

Springs branded "A. D. & Co. 6–98. U. S."
Counter recoil springs.



No. of spring.	Weight.	Exterior diameter.	Diameter of wire.	Height unloaded.	Load when compressed to height of 6 inches.	Closed down.		Load when returned to height of 6 inches.
						Load.	Height.	
	Lbs. Oz.	*Inches.*	*Inch.*	*Inches.*	*Pounds.*	*Pounds.*	*Inches.*	*Pounds.*
1	8 14¾	4.50	.68 × .75	6.90	1,422	4,300	4.15	1,097
2	8 13¾	4.52	.68 × .75	7.02	1,452	4,300	4.14	1,028
3	9 0	4.55	.68 × .75	6.97	1,446	4,500	4.19	1,216
4	8 14	4.51	.68 × .75	7.03	1,476	4,600	4.19	1,090
5	8 14¼	4.50	.68 × .75	6.98	1,443	4,350	4.18	1,110
6	8 13¼	4.53	.68 × .75	6.99	1,405	4,400	4.13	1,150
7	8 9¾	4.53	.68 × .75	6.98	1,380	4,400	4.06	1,000
8	8 11¼	4.51	.68 × .74	6.99	1,344	4,600	4.19	1,002
9	8 14¼	4.53	.68 × .75	7.02	1,590	4,600	4.13	1,142
10	8 15¼	4.54	.68 × .75	7.00	1,575	4,700	4.12	1,240

The tenth spring was closed down and so remained for a period of 16 hours, at the end of which time the load sustained was 1,112 pounds when returned to a height of 6 inches.

The spring was further loaded 100 times, being closed to a height of 4¼″ and released to a height of 6″ between each loading.

Load sustained when 4¼″ high at one hundredth loading, 4,062 pounds.

Load sustained when 6″ high at end of one hundredth loading, 1,095 pounds.

INTERNAL STRAINS

IN

GUN FORGINGS.

INTERNAL STRAINS IN GUN FORGINGS.

Internal strains were introduced by heating the forgings and cooling the same rapidly by quenching from the bore.

The principal series of determinations was made upon metal from the tubes of 5″ R. F. guns.

The initial temperatures of the tubes at the time of quenching, with the rate of flow of the water through the bore at the time of quenching, is given in the following table, together with the initial stresses of compression next the bore at both the breech and muzzle ends of the forging.

The temperature of the water used was 53° to 55° F.

No. of tube.	Temperature.	Rate of flow of water per minute.	Compressive stress next the bore per square inch.		Remarks.
			Breech end.	Muzzle end.	
	°F.	Gallons.	Pounds.	Pounds.	
8589 C	975	150	38,500	36,200	
11226 B_1	975	150	31,900	27,200	
11226 B_1	850	150	28,100	30,800	Second treatment.
11226 B_2	975	150	29,000	26,400	
11226 B_2	850	150	30,000	28,300	Do.
11249 B_1	850	120	34,200	26,000	
11249 B_1	850 B 925 M	135	35,200	32,700	Do.
11249 B_3	850	120	32,800	28,300	
11272 B_1	850	120	32,000	22,000	
11272 B_2	850	120	26,300	15,100	
11272 B_2	1,000	.....	5,500	.....	Annealed.
11272 B_3	800 B 925 M	135	19,600	20,800	
11272 B_3	825 M 960 B	135	40,100	39,700	Second treatment.
11837 B_1	850 B 875 M	120	33,700	29,600	

Further inquiry into the state of internal strains under different conditions were made upon the surplus metal from the ends of a 3″ and a 5″ gun, and also from the chase of a 5″ burst gun.

Observations on the surplus metal from the 3″ gun began with measurements on a section 10″.3 long from the breech end of the forging.

Upon detaching a slice ½″ long from the end of this section the slice as a whole contracted in diameter, a result attributed to the relief of longitudinal strains, compression at the bore, and tension along the exterior surface, which caused the section while intact to assume a bell-mouthed shape at the ends.

It was shown subsequently, after the several concentric rings were detached, that the stress of compression at the bore was 4,500 pounds per square inch when the section was intact, but reached 43,800 pounds per square inch in the ½″ slice.

The rearrangement of strains is further shown when rings 1 and 4 were detached from the ½″ slice, leaving rings 2 and 3 still in the slice. The latter rings were then strained corresponding to stresses of 34,600 pounds compression and 10,900 pounds tension, respectively.

Another series of observations on the remaining metal of the section, which was now 9½″ long, gave results similar to those first obtained.

In this experiment rings 1 and 4 were detached, leaving rings 2 and 3 with the intervening metal attached to the end of the section. This was followed by detaching the sides of the latter rings from the adjacent metal and finally detaching the rings altogether from the section.

At each stage there was a change in the state of the internal strains.

The internal strains were practically eliminated in a slice which was annealed by heating to a full red and slowly cooled.

Observations on the surplus metal from the muzzle end of this forging further shows the influence of associated metal in modifying the internal strains present.

The examination of the surplus metal from a 5″ gun tube began while the metal was attached to the ends of the tube.

There was 3½″ surplus length at the breech end and 5⅞″ at the muzzle end.

When the section from the breech end was cut off, the strains released at the bore were represented by a tensile stress of 12,990 pounds per square inch at a distance of ½″ from the outer end of the section, and a stress of 8,660 pounds per square inch compression at a distance of 3″ from the same end; that is, the outer end of the section contracted in diameter and the inner end expanded upon being detached from the tube.

The new end of the tube, formed upon the removal of the 3½″ section, expanded at the bore an amount represented by a stress of 21,030 pounds per square inch.

In the subsequent states the measurements at the bore showed the strains and corresponding stresses recorded in the following tables and also shown in the diagram given below.

Bore diameters one-half inch from end (face A–B) and stresses corresponding to the strains released.

AT ONE-HALF INCH POINTS.

State of experimental section.	Mean diameter.	Strain.	Stress per square inch.
	Inches.	*Inch.*	*Pounds.*
Tube intact	4.8497	.00335	20,710 compression.
3½″ section detached:			
Watervliet measurements	4.8476	.00545	33,690 compression.
Watertown measurements	4.8477	.00535	33,070 compression.
3½″ section faced off to 2″.97	4.84795	.0051	31,530 compression.
½″ slice detached	4.8473	.00575	35,540 compression.
Inside ring of ½″ slice taken out	4.85305	0.	0

At about the middle of the length of the 3½″ section, or 1½″ from the end of the tube, the results with the bore diameters were as follows:

AT 1½ INCH POINTS.

State of experimental section.	Mean diameter.	Strain.	Stress per square inch.
	Inches.	*Inch.*	*Pounds.*
Tube intact	4.8522	.0055	33,970 compression.
3½″ section detached	4.85115	.00655	40,450 compression.
3½″ section faced off to 2″.97	4.85125	.00645	39,830 compression.
3½″ section reduced to 2″.06 long, by slice ½ long from face A–B removed	4.8521	.0056	34,580 compression.
On piece 1″.14, faces A–B and A_1–B_1 removed	4.85195	.00575	35,510 compression.
Inside ring detached	4.8577	0.	0

Near face A_1–B_1, or 3″ from the end of the forging, the results with the bore diameters were as follows:

AT 3-INCH POINTS.

State of experimental section.	Mean diameter.	Strain.	Stress per square inch.
	Inches.	*Inch.*	*Pounds.*
Tube intact	4.8518	.00625	38,600 compression.
3½″ section detached:			
Watervliet	4.8582	.00485	29,950 compression.
Watertown	4.85335	.0047	29,020 compression.
3½″ section faced off to 2″.97	4.85325	.0048	29,640 compression.
½″ slice face A–B removed; section now 2″.06 long	4.85325	.0048	29,640 compression.
On ½″ slice detached	4.85305	.0050	30,880 compression.
Inside ring, face A_1–B_1	4.85805	0.	0

From the initial and final observations on the bore diameters it is shown that the stresses when the tube was intact were:

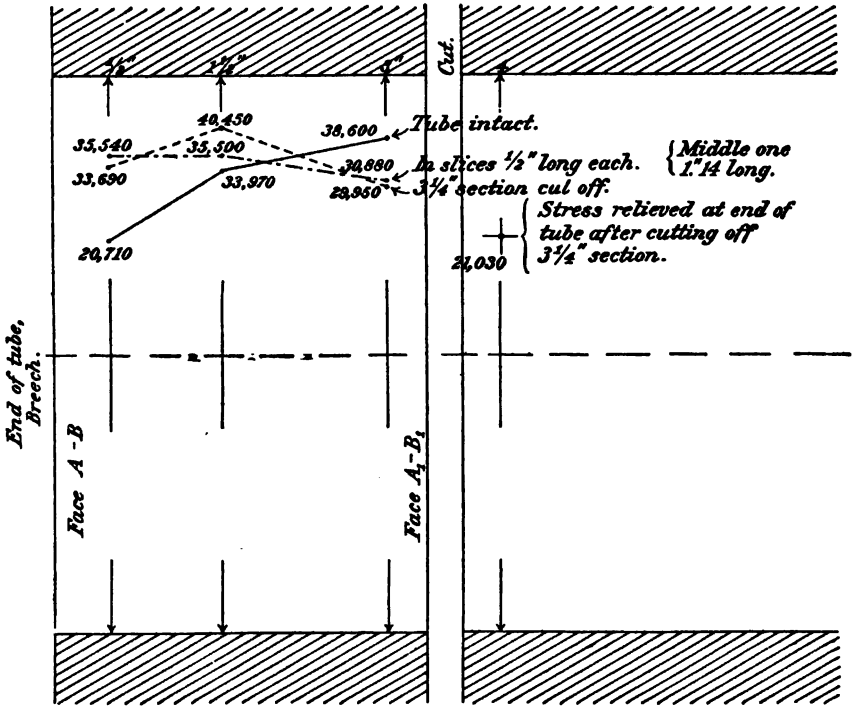
	Distance from end of tube.			Stress.
	½ inch.	1½ inches.	3 inches.	
Tube intact	20,710	33,970	38,600	Compression.

And in the state of slices ½″ long the stresses were:

	Distance from end of tube.			Stress.
	½ inch.	1½ inches.	3 inches.	
½″ slices	35,540	a 35,510	30,880	Compression.

a Slice 1″.14 long.

Sketch showing the stresses at different states of the metal.



The details of the tests show the changes in strains which occurred on the two faces of the section and in the concentric rings as different slices and rings were successively detached.

At the muzzle end the bore was eccentric with the exterior surface of the rough turned forging, on one side the metal having a thickness of 1".617, and on the other side 2".153. This eccentricity, disturbing the symmetry of the cross-sectional form, very materially modified the disposition of the internal strains found in the $5\frac{7}{8}$" section.

When this section was cut off the end of the tube expanded, corresponding to a stress of 12,680 pounds per square inch at the bore.

Upon turning off the eccentric metal from the $5\frac{7}{8}$" section, reducing the exterior diameter to 8".075, the effect on the diameters at the bore was as follows:

Distance from end of original forging.	Diameters.	
	A. Expanded.	B. Contracted.
Inches.	*Inch.*	*Inch.*
$\frac{1}{4}$	.0011	.0004
$1\frac{1}{4}$	.0011	.0003
$3\frac{1}{4}$	.0013	.0002
$5\frac{1}{4}$	.0013	0.

The total changes at the bore, from the state of the metal in the tube to the final state of detached rings, were:

Distance from end of original forging.	Diameters.	
	A.	B.
Inches.	*Inch.*	*Inch.*
½	+.0071	−.0025
1½	+.0087	+.0027
3½	+.0074	+.0081
5½	+.0083	+.0023

Diameter A passed through the places of maximum and minimum thickness.

The metal in the chase of the 5″ burst gun was examined along intact parts of the tube.

This was a neutral tube, i. e., one not having been treated for the purpose of introducing therein internal strains at the time of the manufacture of the gun.

The examination of rings ″.15 thick was followed by observations upon the behavior of thinner rings next the bore, and finally cutting apart radially these several rings.

The rings next the bore when cut apart radially closed in at the ends as shown in the following table;

Distance from muzzle.	Thickness of rings.	Ends closed in on a chord of 1″.
Inches.	*Inch.*	*Inch.*
4	.15	.23
60	.15	.34
96	.15	.44
132	.15	.23
60	.10	.625
96	.10	.55
132	.10	.36

A ring ″.0535 thick taken 4″ from the muzzle closed in, the ends overlapping a distance of 1″.30.

The ″.15 rings from the bore, when detached from their slices, contracted in four cases, showing internal strains of tension existed in the gun, and in one case expanded, showing compression strains.

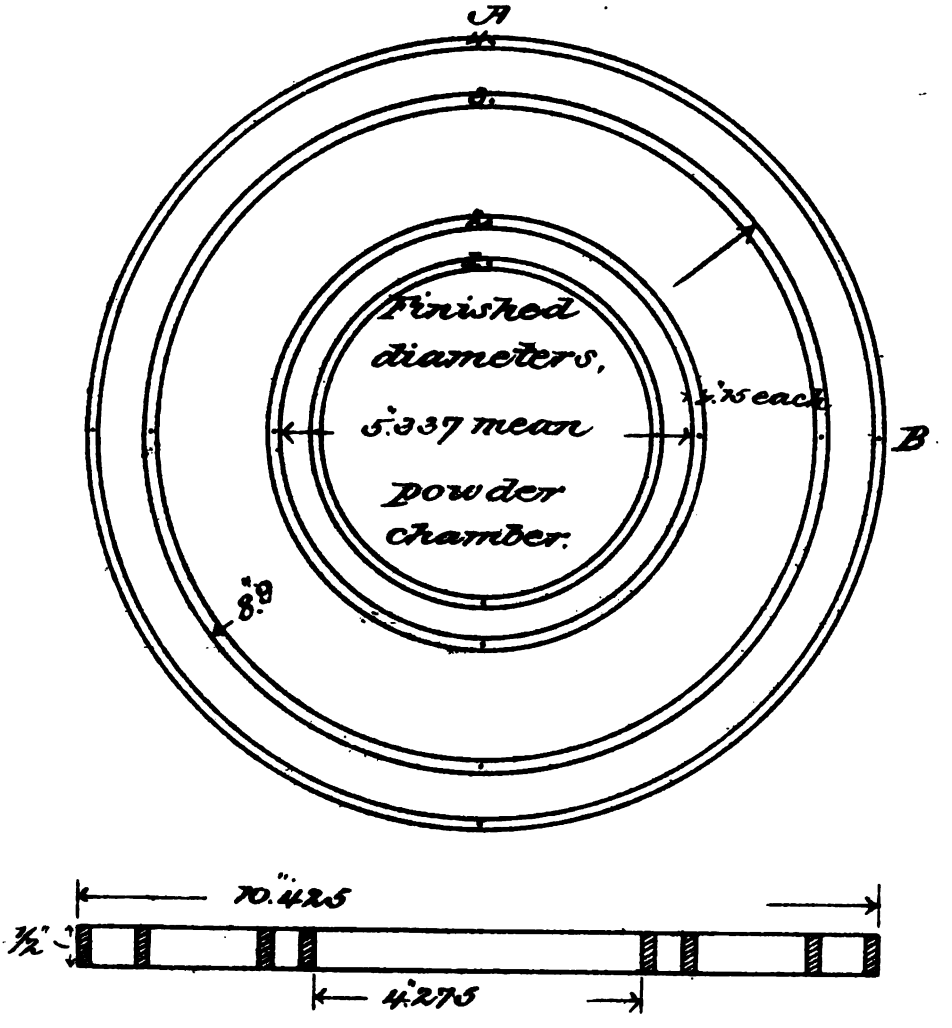
The behavior of the rings when cut apart radially indicated the presence of residual strains in these rings not released upon detaching from the slices, and showing internal strains of tension of considerable intensity at the immediate surface of the bore.

INTERNAL STRAINS

IN

5-INCH R. F. GUN TUBES.

5-inch R.F. Gun Tube.
Marks, "8589 C, 5 R.F., 2 T."
Breech Slice.



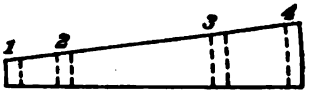
No. 8589 C.

BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

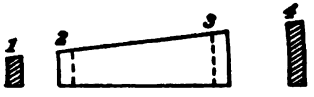
SLICE INTACT.

Interior diameter of slice, 4″.275. Exterior diameter, 10″.425.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.4408	.....	.0057	.....	38,500
2	5.4929	.....	.00875	.....	20,500
3	8.75315	.0040	.....	13,700	.....
4	10.27925	.0089	.....	26,000	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.34. Exterior diameter, 8″.9.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.4465	.....	.....	.....	.....
2	5.4938	.....	.00285	.....	15,600
3	8.75235	.0032	.....	11,000	.....
4 detached	10.27035	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.49665	.....	.....	.....	.....
3 detached	8.74915	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.275. Exterior diameter, 10″.425.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4394	4.4422	4.4408
2	5.4963	5.4895	5.4929
3	8.7547	8.7516	8.75315
4	10.2774	10.2811	10.27925

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.34. Exterior diameter, 8″.9.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4449	4.4481	4.4465
2	5.4978	5.4903	5.4938
3	8.7540	8.7507	8.75235
4 detached	10.2649	10.2758	10.27035

RINGS ALL DETACHED.

2 detached	5.5000	5.4933	5.49665
3 detached	8.7508	8.7475	8.74915

Breech strains released:

Rings.	Diameter.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	+.0055	+.0059	+.0057
2 in slice	+.0010	+.0008	+.0009
3 in slice	—.0007	—.0009	—.0008
4 detached	—.0125	—.0053	—.0089

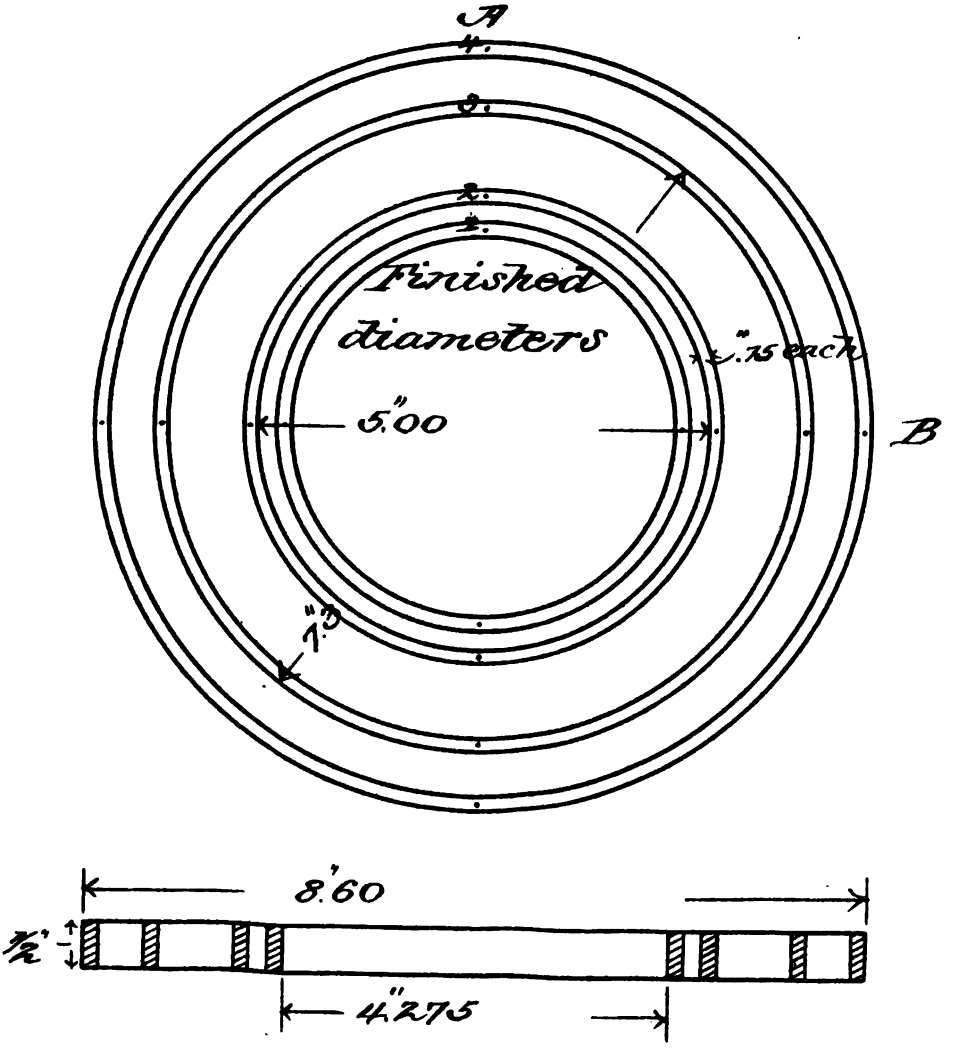
SECOND TO THIRD PHASE.

2 detached	+.0027	+.0030	+.00285
3 detached	—.0082	—.0082	—.0082

FIRST TO THIRD PHASE.

2 detached	+.0037	+.0038	+.00375
3 detached	—.0039	—.0041	—.0040

5-inch R F Gun Tube.
Marks. "8589 C, 5 R F, 2 T."
Muzzle Slice



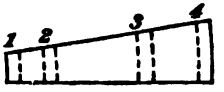
No. 8589 C.

Muzzle Slice.

State of internal strains and stresses at different phases of the slice.

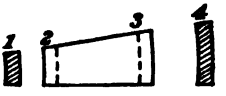
SLICE INTACT.

Interior diameter of slice, 4″.275. Exterior diameter, 8″.60.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.4366		.00535		36,200
2	5.15085		.00205		11,900
3	7.1593	.00285		11,900	
4	8.4372	.0042		14,900	

Rings 1 and 4 detached, rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.44195				
2	5.1503		.0026		15,100
3	7.1585	.00205		8,500	
4 detached	8.4330				

RINGS ALL DETACHED.

2 detached	5.1529				
3 detached	7.15645				

Muzzle Slice.

Interior diameter, 4″.275. Exterior diameter, 8″.60.
Original diameter of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4348	4.4384	4.4366
2	5.1501	5.1516	5.15085
3	7.1586	7.1600	7.1593
4	8.4480	8.4314	8.4372

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4414	4.4425	4.44195
2	5.1495	5.1511	5.1503
3	7.1575	7.1596	7.1585
4 detached	8.4329	8.4331	8.4330

RINGS ALL DETACHED.

2 detached	5.1521	5.1537	5.1529
3 detached	7.1569	7.1570	7.15645

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	+.0066	+.0041	+.00535
2 in slice	−.0006	−.0005	−.00055
3 in slice	−.0011	−.0005	−.0008
4 detached	−.0101	+.0017	−.0042

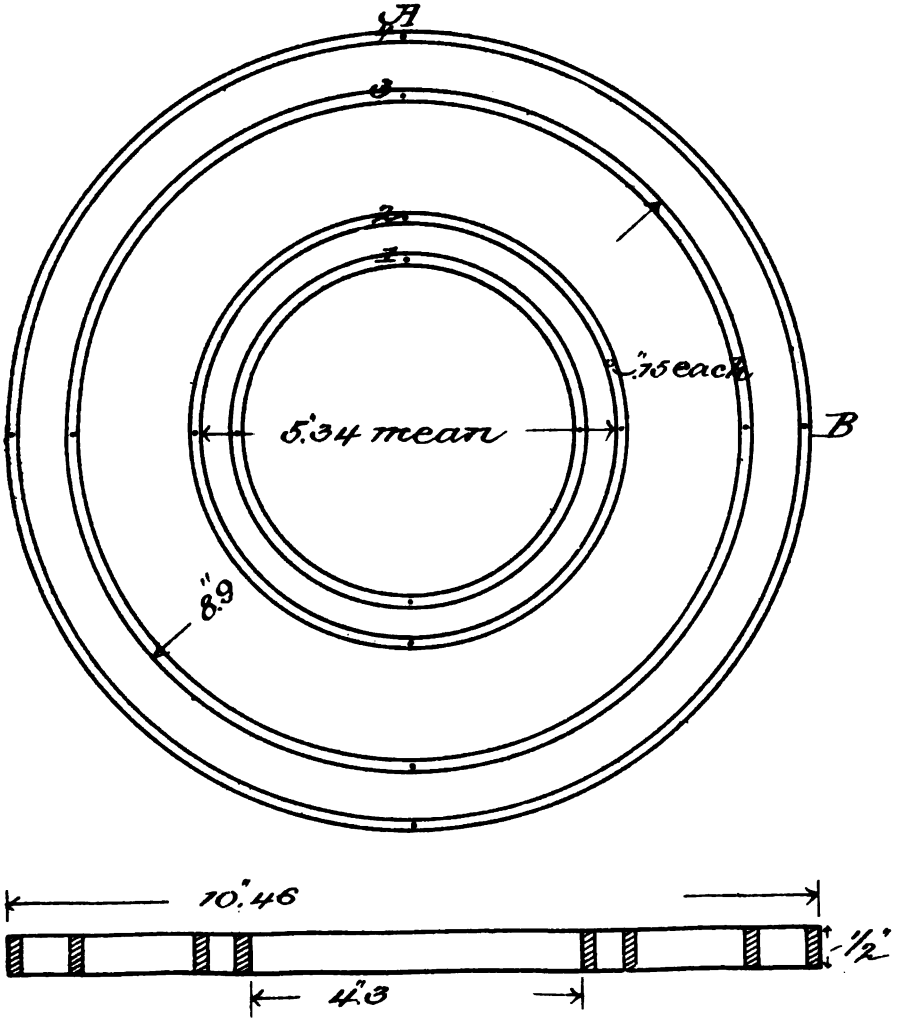
SECOND TO THIRD PHASE.

2 detached	+.0026	+.0026	+.0026
3 detached	−.0016	−.0025	−.00205

FIRST TO THIRD PHASE.

2 detached	+.0020	+.0021	+.00205
3 detached	−.0027	−.0030	−.00285

5-inch R. F. Gun Tube.
Marks 11,226 B 1.
Breech Slice.



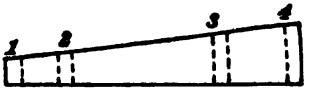
No. 11226 B_1.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

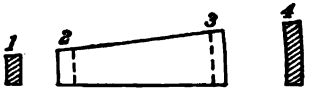
SLICE INTACT.

Interior diameter of slice, 4″.3. Exterior diameter, 10″.46.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.4624	.....	.00475	.....	31,900
2	5.4985	.....	.00275	.....	15,000
3	8.7533	.00825	.....	11,100	.....
4	10.2993	.00405	.....	11,800	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice 5″.34. Exterior diameter 8″.9.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.46715	.....	.....	.....	.....
2	5.49715	.....	.0041	.....	22,400
3	8.75235	.0028	.....	7,800	.....
4 detached	10.29525	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.50125	.....	.....	.....	.....
3 detached	8.7500	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.3. Exterior diameter, 10″.46.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4639	4.4609	4.4624
2	5.5019	5.4951	5.4985
3	8.7522	8.7544	8.7533
4	10.3028	10.2958	10.2993

Rings 1 and 4 detached, rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4688	4.4655	4.46715
2	5.5007	5.4936	5.49715
3	8.7514	8.7533	8.75235
4 detached	10.3009	10.2896	10.29525

RINGS ALL DETACHED.

2 detached	5.5050	5.4975	5.50125
3 detached	8.7492	8.7509	8.75005

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0049	+.0046	+.00475
2 in slice	−.0012	−.0015	−.00135
3 in slice	−.0008	−.0011	−.00095
4 detached	−.0019	−.0062	−.00405

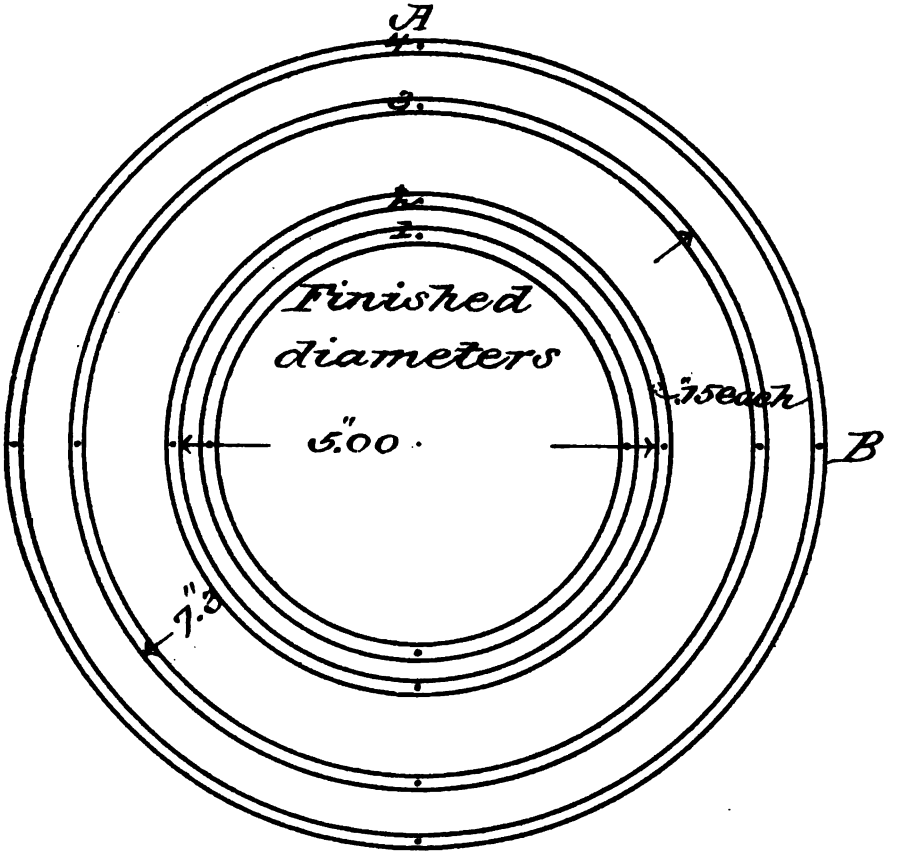
SECOND TO THIRD PHASE.

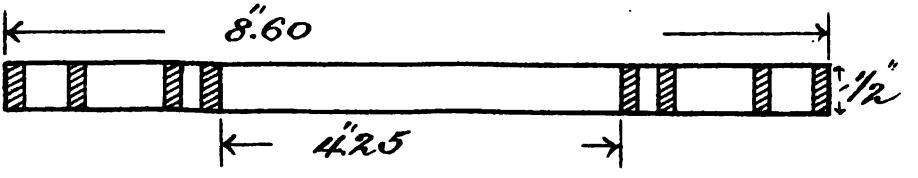
2 detached	+.0043	+.0039	+.0041
3 detached	−.0022	−.0024	−.0023

FIRST TO THIRD PHASE.

2 detached	+.0031	+.0024	+.00275
3 detached	−.0030	−.0035	−.00325

5-inch R F Gun Tube.
Marks II, 226 B 1.
Muzzle Slice.





H Doc 300 56 1

No. 11226 B_1.

Muzzle Slice.

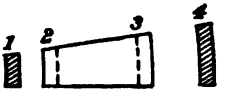
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.25. Exterior diameter, 8″.60.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.4040		.0040		27,200
2	5.1464		.00415		24,200
3	7.1446	.00325		13,600	
4	8.4348	.00315		11,200	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.4080				
2	5.14605		.0045		26,200
3	7.1445	.00315		13,200	
4 detached	8.43165				

RINGS ALL DETACHED.

2 detached	5.15055				
3 detached	7.14135				

Muzzle Slice.

Interior diameter, 4″.25. Exterior diameter, 8″.60.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4042	4.4038	4.4040
2	5.1476	5.1452	5.1464
3	7.1452	7.1440	7.1446
4	8.4339	8.4357	8.4348

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4080	4.4080	4.4080
2	5.1472	5.1449	5.14605
3	7.1451	7.1439	7.1445
4 detached	8.4286	8.4347	8.43165

RINGS ALL DETACHED.

2 detached	5.1510	5.1501	5.15055
3 detached	7.1425	7.1402	7.14135

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0038	+.0042	+.0040
2 in slice	—.0004	—.0003	—.00035
3 in slice	—.0001	—.0001	—.0001
4 detached	—.0053	—.0010	—.00315

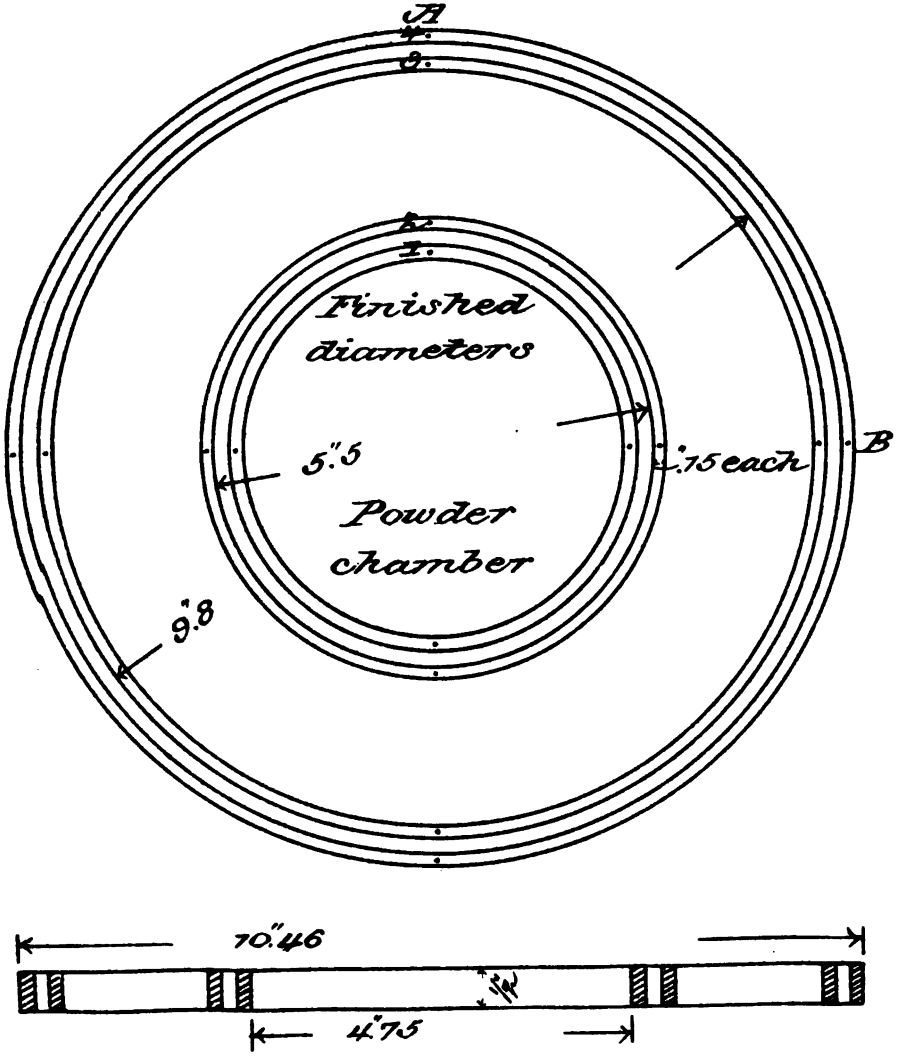
SECOND TO THIRD PHASE.

2 detached	+.0038	+.0052	+.0045
3 detached	—.0026	—.0037	—.00315

FIRST TO THIRD PHASE.

2 detached	+.0034	+.0049	+.00415
3 detached	—.0027	—.0038	—.00325

5-inch R.F. Gun Tube.
Marks 7226 B_1
Breech Slice.



No. 11226 B_1.

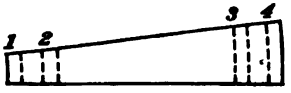
(Second treatment.)

BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

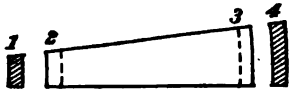
SLICE INTACT.

Interior diameter of slice, 4″.75. Exterior diameter. 10″.46.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.9113	.....	.0046	.....	28,100
2	5.6390	.....	.0039	.....	20,700
3	9.6444	.00415	.....	12,900	.....
4	10.3013	.00105	.....	3,100	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.5. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.9159	.....	.....	.....	.....
2	5.6377	.....	.0052	.....	27,700
3	9.64355	.0033	.....	10,300	.....
4 detached	10.30025	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.6429	.....	.....	.....	.....
3 detached	9.64025	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.75. Exterior diameter, 10″.46.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9106	4.9120	4.9113
2	5.6385	5.6396	5.6390
3	9.6483	9.6405	9.6444
4	10.3040	10.2986	10.3013

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9151	4.9167	4.9159
2	5.6371	5.6383	5.6377
3	9.6472	9.6399	9.64355
4 detached	10.3086	10.2919	10.3002

RINGS ALL DETACHED.

2 detached	5.6432	5.6426	5.6429
3 detached	9.6453	9.6352	9.64025

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0045	+.0047	+.0046
2 in the slice	−.0014	−.0012	−.0013
3 in the slice	−.0011	−.0006	−.00085
4 detached	+.0046	−.0067	−.00105

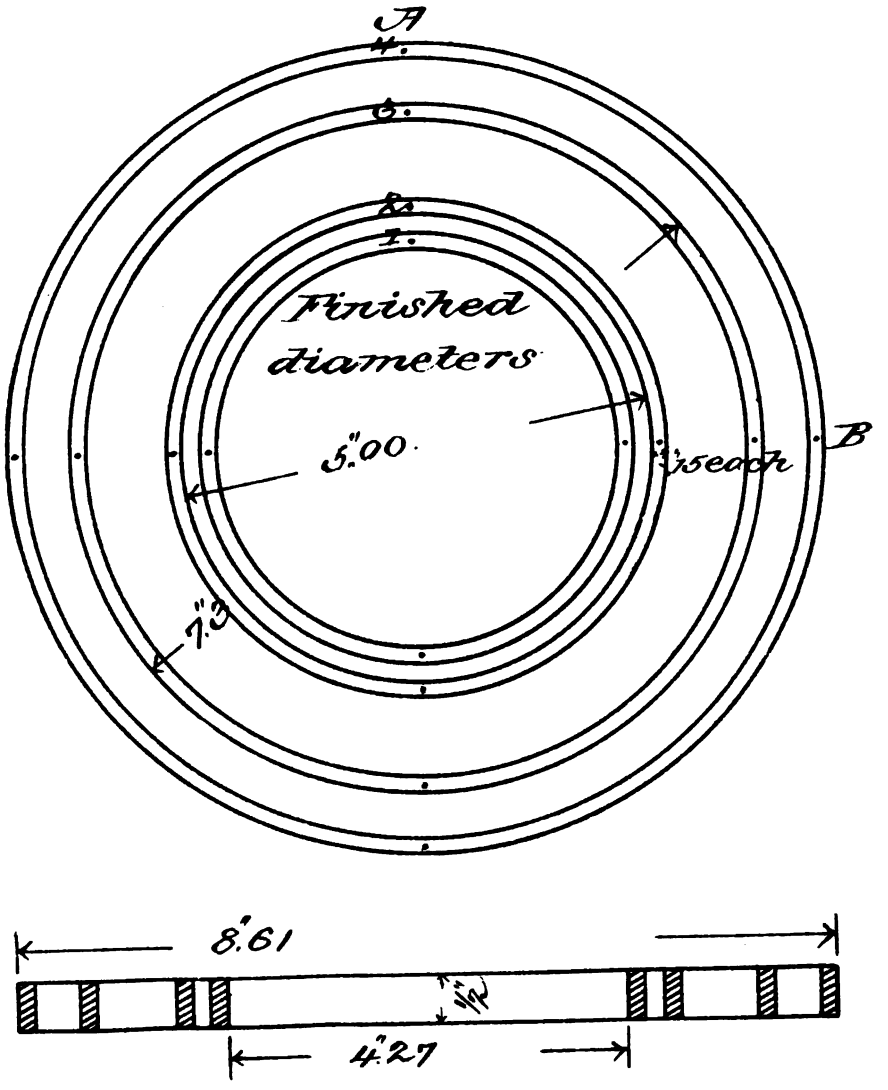
SECOND TO THIRD PHASE.

2 detached	+.0061	+.0043	+.0052
3 detached	−.0019	−.0047	−.0033

FIRST TO THIRD PHASE.

2 detached	+.0047	+.0031	+.0039
3 detached	−.0030	−.0058	−.00415

5-inch R. F. Gun Tube.
Marks 7226 B1
Muzzle Slice.



No. 11226 B_1.

(Second treatment.)

MUZZLE SLICE.

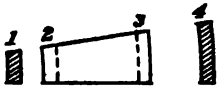
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.27. Exterior diameter, 8″.61

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.43045		.00455		30,800
2	5.1464		.00155		9,000
3	7.1342	.00185		7,800	
4	8.4462	.00025		900	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.4350				
2	5.1455		.00245		14,300
3	7.13855	.0012		5,000	
4 detached	8.44595				

RINGS ALL DETACHED.

2 detached	5.14795				
3 detached	7.18255				

Muzzle Slice.

Interior diameter, 4″.27. Exterior diameter, 8″.61.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4307	4.4302	4.43045
2	5.1449	5.1479	5.1464
3	7.1311	7.1373	7.1342
4	8.4404	8.4520	8.4462

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4350	4.4350	4.4350
2	5.1438	5.1472	5.1455
3	7.1302	7.1369	7.13355
4 detached	8.4483	8.4486	8.44595

RINGS ALL DETACHED.

2 detached	5.1463	5.1496	5.14795
3 detached	7.1284	7.1368	7.13235

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0043	+.0048	+.00455
2 in the slice	−.0011	−.0007	−.0009
3 in the slice	−.0009	−.0004	−.00065
4 detached	+.0079	−.0084	−.00025

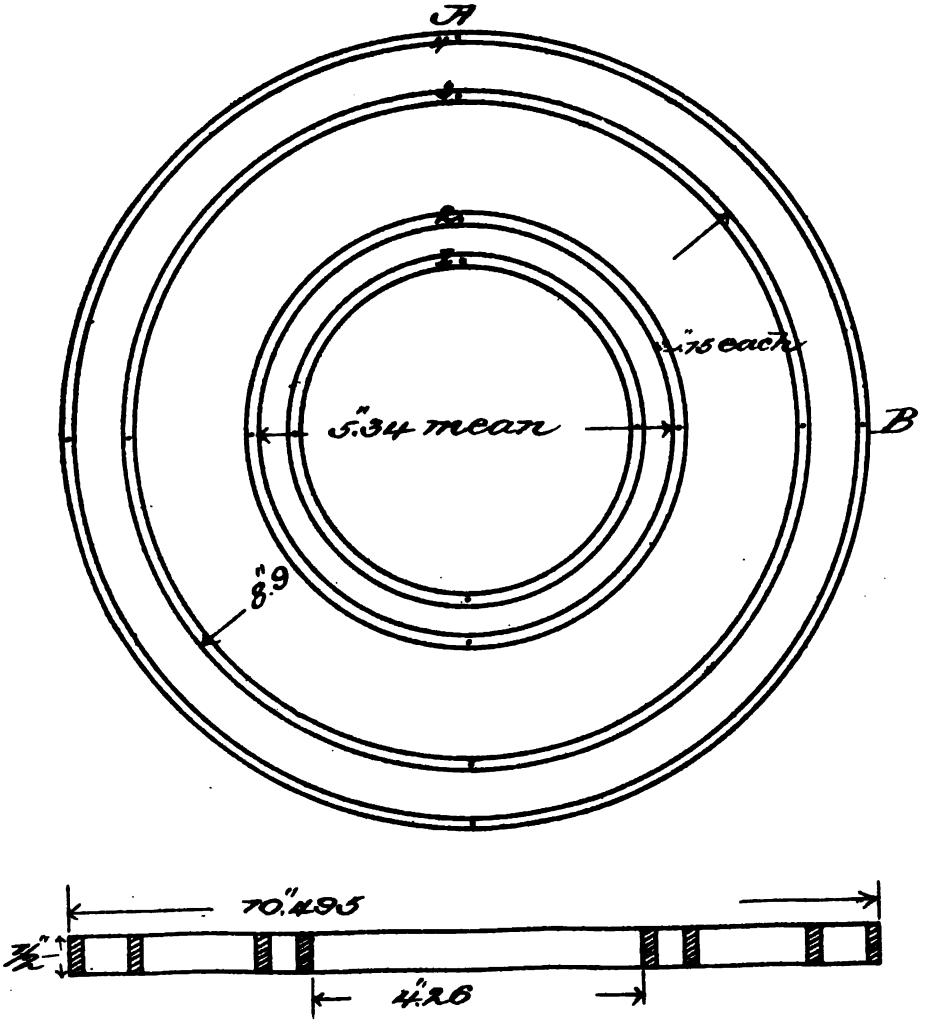
SECOND TO THIRD PHASE.

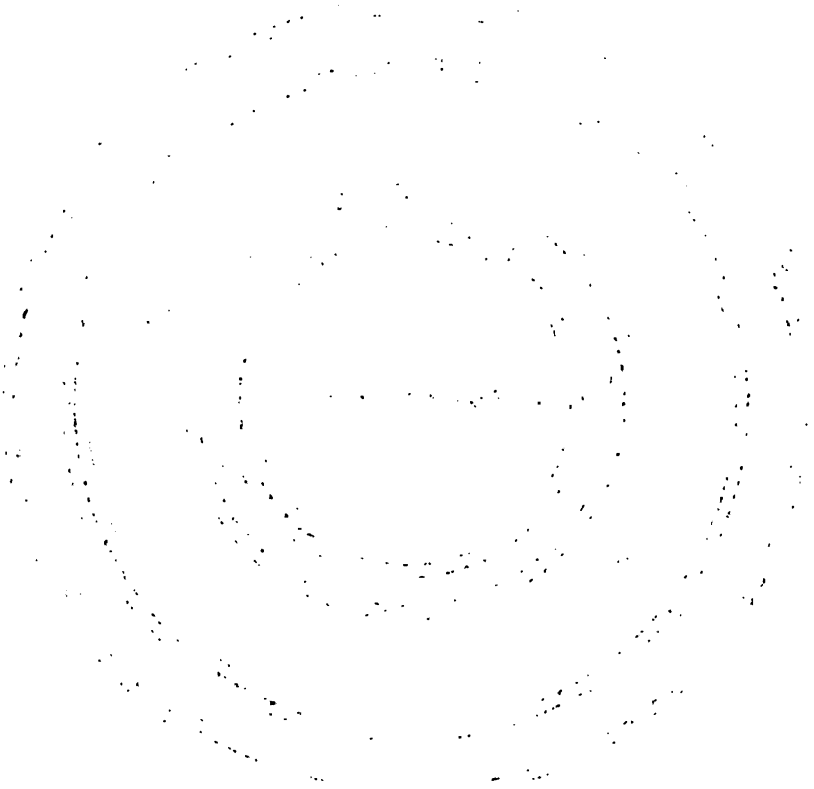
2 detached	+.0025	+.0024	+.00245
3 detached	−.0018	−.0006	−.0012

FIRST TO THIRD PHASE.

2 detached	+.0014	+.0017	+.00155
3 detached	−.0027	−.0010	−.00185

5-inch R F Gun Tube.
Marks 11,226 B 2.
Breech Slice





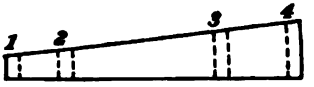
No. 11226 B_3.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

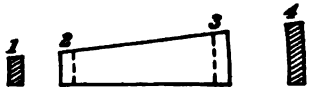
SLICE INTACT.

Interior diameter of slice, 4″.26. Exterior diameter, 10″.495.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.44035	.....	.0043	.....	29,000
2	5.4960	.....	.00345	.....	18,800
3	8.7573	.00455	.....	15,600	.....
4	10.27385	.00295	.....	8,600	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.34. Exterior diameter, 8″.9.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.44465	.....	.....	.....	.....
2	5.49495	.....	.0045	.....	24,600
3	8.75685	.0041	.....	14,000	.....
4 detached	10.2709	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.49945	.....	.....	.....	.....
3 detached	8.75275	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.26. Exterior diameter, 10″.495.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4408	4.4399	4.44035
2	5.4989	5.4931	5.4960
3	8.7526	8.7620	8.7573
4	10.2677	10.2800	10.27385

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4462	4.4481	4.44465
3	5.4981	5.4918	5.49495
3	8.7523	8.7614	8.75685
4 detached	10.2551	10.2867	10.2709

RINGS ALL DETACHED.

2 detached	5.5012	5.4977	5.49945
3 detached	8.7485	8.7570	8.75275

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0054	+.0032	+.0043
2 in slice	−.0008	−.0013	−.00105
3 in slice	−.0003	−.0006	−.00045
4 detached	−.0126	+.0067	−.00295

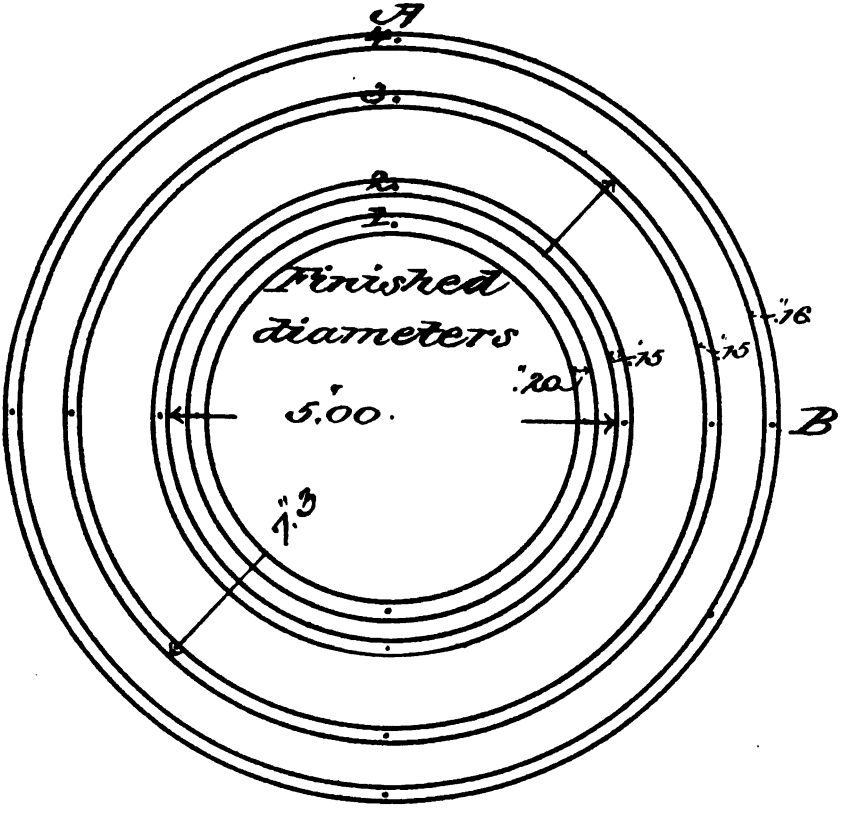
SECOND TO THIRD PHASE.

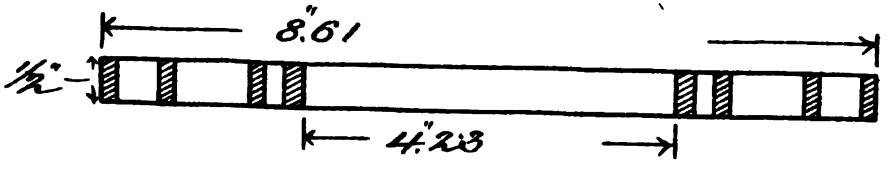
2 detached	+.0031	+.0059	+.0045
3 detached	−.0038	−.0044	−.0041

FIRST TO THIRD PHASE.

2 detached	+.0023	+.0046	+.00345
3 detached	−.0041	−.0050	−.00455

5-inch R.F. Gun Tube.
Mark 5, 11,226 B2
Muzzle Slice





No. 11226 B_2.

Muzzle Slice.

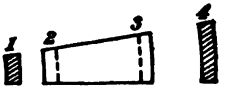
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.23. Exterior diameter, 8″.61.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.4293		.0039		26,400
2	5.1492		.00235		13,700
3	7.14796	.00325		13,600	
4	8.45265		.0043		15,300

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.4332				
2	5.1490		.00355		20,700
3	7.1471	.0024		10,100	
4 detached	8.45695				

RINGS ALL DETACHED.

2 detached	5.15155				
3 detached	7.1447				

Muzzle Slice.

Interior diameter, 4″.23. Exterior diameter, 8″.61.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4301	4.4285	4.4293
2	5.1524	5.1460	5.1492
3	7.1509	7.1450	7.14795
4	8.4532	8.4521	8.45265

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4341	4.4323	4.4332
2	5.1513	5.1447	5.1480
3	7.1502	7.1440	7.1471
4 detached	8.4507	8.4632	8.45695

RINGS ALL DETACHED.

2 detached	5.1556	5.1475	5.15155
3 detached	7.1477	7.1417	7.1447

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0040	+.0038	+.0039
2 in slice	−.0011	−.0018	−.0012
3 in slice	−.0007	−.0010	−.00085
4 detached	−.0025	+.0111	+.0043

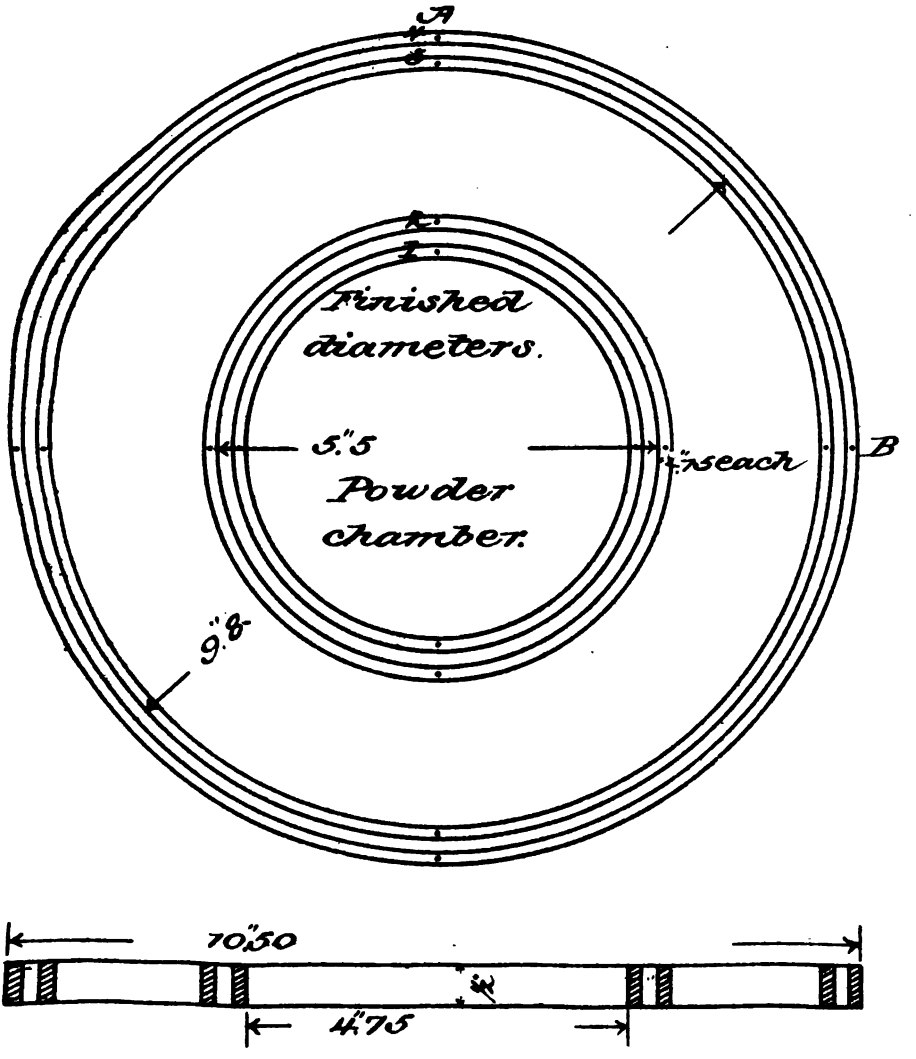
SECOND TO THIRD PHASE.

2 detached	+.0043	+.0028	+.00355
3 detached	−.0025	−.0023	−.0024

FIRST TO THIRD PHASE.

2 detached	+.0032	+.0015	+.00235
3 detached	−.0032	−.0033	−.00325

5-inch R.F. Gun Tube.
Marks 7 T 2 B 2
Breech Slice.



No. 11226 B_3.

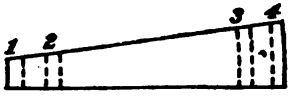
Second treatment.

BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

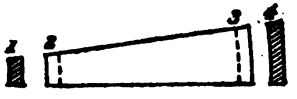
SLICE INTACT.

Interior diameter of slice, 4″.75. Exterior diameter, 10″.50.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.90065	.....	.0049	.....	30,000
2	5.6447	.....	.00485	.....	23,100
3	9.6408	.0033	.....	10,300	.....
4	10.33605	.00225	.....	6,500	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.5. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.90555	.....	.....	.....	.....
2	5.6434	.....	.00565	.....	30,000
3	9.6402	.0027	.....	8,400	.....
4 detached	10.3338	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.64905	.....	.....	.....	.....
3 detached	9.6375	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.75. Exterior diameter, 10″.50.
Original diameter of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.8992	4.9021	4.90065
2	5.6434	5.6460	5.6447
3	9.6440	9.6376	9.6408
4	10.3355	10.3366	10.33605

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9044	4.9067	4.90555
2	5.6420	5.6448	5.6434
3	9.6432	9.6372	9.6402
4 detached	10.3360	10.3316	10.3338

RINGS ALL DETACHED.

2 detached	5.6485	5.6496	5.64905
3 detached	9.6430	9.6320	9.6375

Breech strains released.

Rings.	Diameters.		Mean.
	A.	B.	
	Inch.	*Inch.*	*Inch.*
1 detached	+.0052	+.0046	+.0049
2 in slice	−.0014	−.0012	−.0013
3 in slice	−.0008	−.0004	−.0006
4 detached	+.0005	−.0050	−.00225

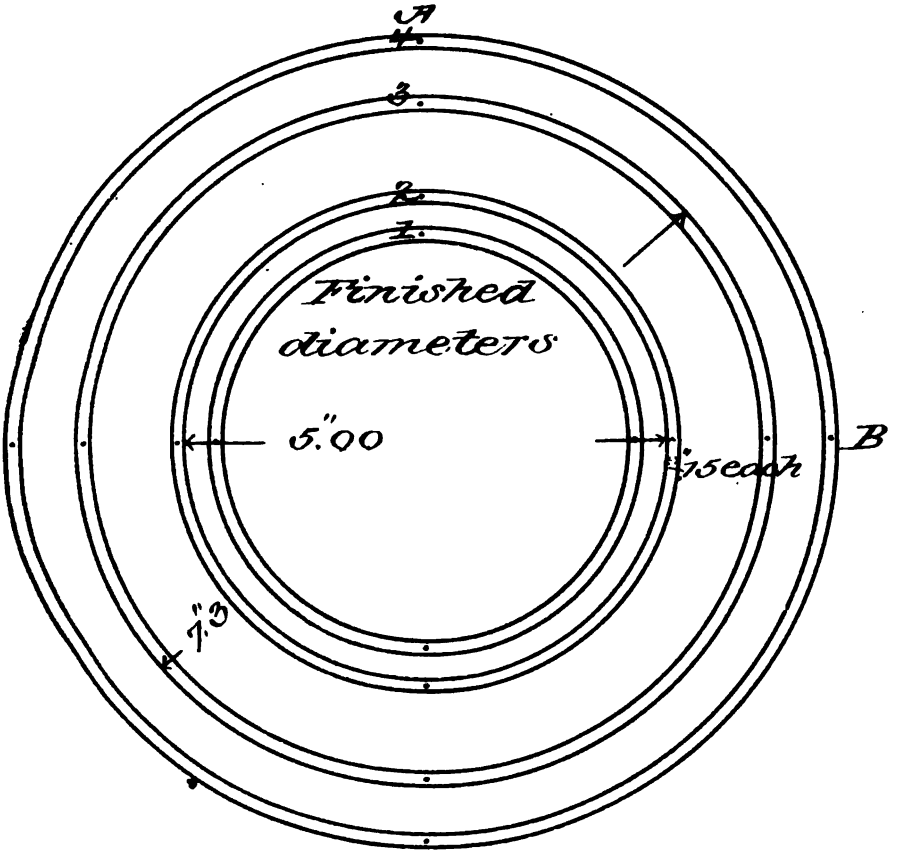
SECOND TO THIRD PHASE.

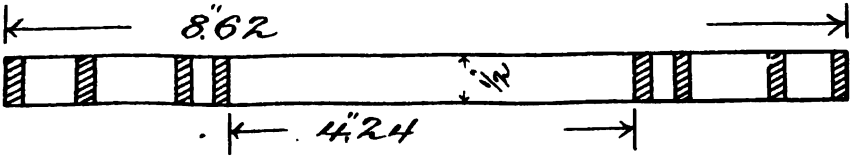
2 detached	+.0065	+.0048	+.00565
3 detached	−.0002	−.0052	−.0027

FIRST TO THIRD PHASE.

2 detached	+.0051	+.0036	+.00435
3 detached	−.0010	−.0056	−.0033

5-inch R.F. Gun Tube.
Marks 1 1226 B 2
Muzzle Slice.





No. 11226 B_2.

(Second treatment.)

MUZZLE SLICE.

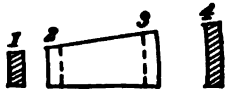
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.24. Exterior diameter, 8″.62.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.3975	.....	.00415	.....	28,300
2	5.14505	.....	.0006	.....	3,400
3	7.1304	.0017	.....	7,100	.....
4	8.46955	.0006	.....	2,100	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.40165	.....	.....	.....	.....
2	5.14495	.....	.0013	.....	7,500
3	7.1298	.0011	.....	4,600	.....
4 detached	8.46895	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.14565	.....	.....	.....	.....
3 detached	7.1287	.....	.....	.....	.....

Muzzle Slice.

Interior diameter, 4″.24. Exterior diameter, 8″.62.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.3982	4.4018	4.3975
2	5.1427	5.1474	5.14505
3	7.1313	7.1295	7.1304
4	8.4750	8.4641	8.46955

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.3974	4.4059	4.40165
2	5.1421	5.1466	5.14435
3	7.1310	7.1286	7.1298
4 detached	8.4685	8.4694	8.46895

RINGS ALL DETACHED.

2 detached	5.1438	5.1475	5.14565
3 detached	7.1297	7.1277	7.1287

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0042	+.0041	+.00415
2 in slice	−.0006	−.0008	−.0007
3 in slice	−.0008	−.0009	−.0006
4 detached	−.0065	+.0058	−.0006

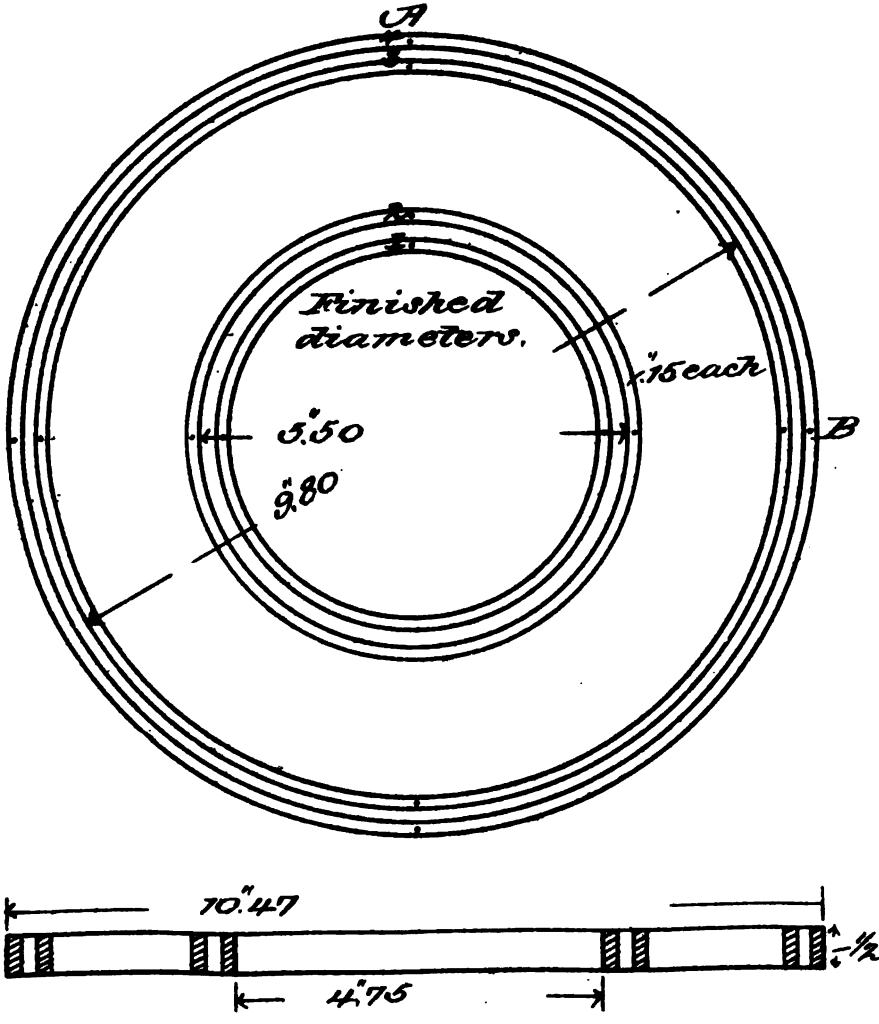
SECOND TO THIRD PHASE.

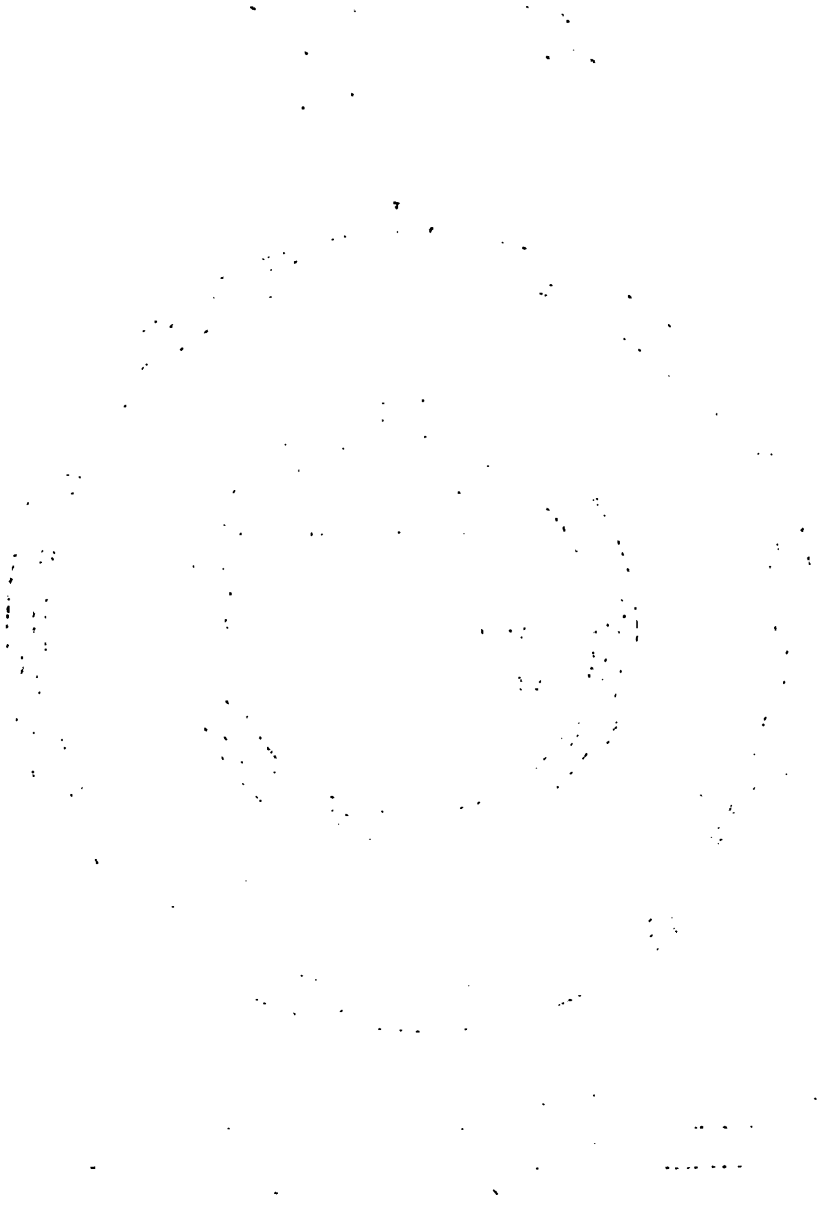
2 detached	+.0017	+.0009	+.0013
3 detached	−.0018	−.0009	−.0011

FIRST TO THIRD PHASE.

2 detached	+.0011	+.0001	+.0006
3 detached	−.0016	−.0018	−.0017

6-inch R.F. Gun Tube.
Marks 11249 B1.
Breech Slice.





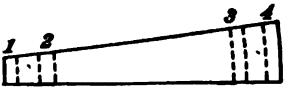
No. 11249 B_1.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

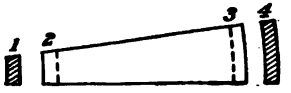
SLICE INTACT.

Interior diameter of slice, 4″.75. Exterior diameter, 10″.47.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.90545	.....	.0056	.....	34,200
2	5.65095	.....	.0019	.....	10,100
3	9.64305	.0033	.....	10,300	.....
4	10.2338	.00415	.....	12,200	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.91105	.....	.....	.....	.....
2	5.64945	.....	.0034	.....	18,100
3	9.64195	.0022	.....	6,800	.....
4 detached	10.22965	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.65285	.....	.....	.....	.....
3 detached	9.63975	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.75. Exterior diameter, 10″.47.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9056	4.9053	4.90545
2	5.6538	5.6481	5.65095
3	9.6430	9.6431	9.64305
4	10.2409	10.2267	10.2338

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9114	4.9107	4.91105
2	5.6525	5.6464	5.64945
3	9.6420	9.6419	9.64195
4 detached	10.2416	10.2177	10.22965

RINGS ALL DETACHED.

2 detached	5.6551	5.6506	5.65285
3 detached	9.6404	9.6391	9.63975

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0058	+.0054	+.0056
2 in slice	−.0013	−.0017	−.0015
3 in slice	−.0010	−.0012	−.0011
4 detached	+.0007	−.0090	−.00415

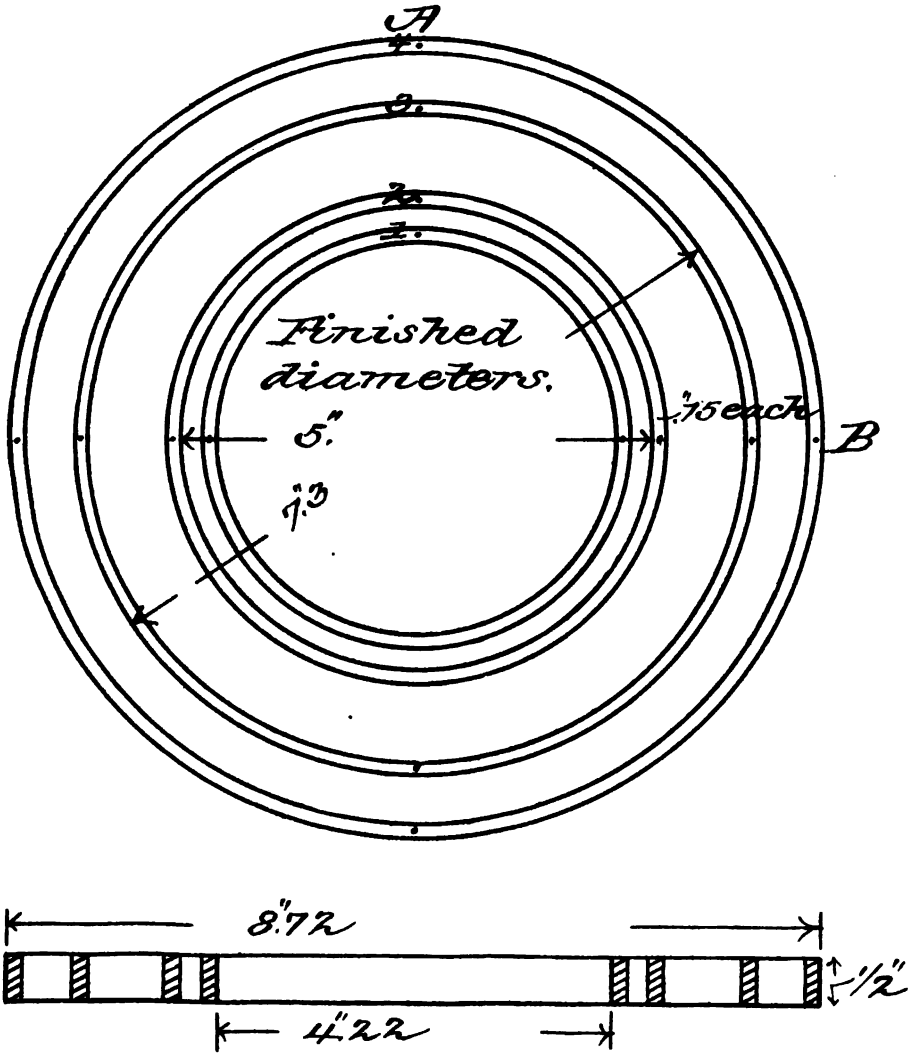
SECOND TO THIRD PHASE.

2 detached	+.0026	+.0042	+.0034
3 detached	−.0016	−.0028	−.0022

FIRST TO THIRD PHASE.

2 detached	+.0013	+.0025	+.0019
3 detached	−.0026	−.0040	−.0033

5-inch R. F. Gun Tube.
Marks 11248 B1.
Muzzle Slice.



No. 11249 B_1.

MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.22. Exterior diameter, 8″.72.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.37665	.....	.0038	.....	26,000
2	5.14505	.....	.00015	.....	900
3	7.1547	.00125	.....	5,200	.....
4	8.5507	.00175	.....	6,100	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.38045	.....	.....	.....	.....
2	5.1440	.....	.0012	.....	7,000
3	7.1539	.00045	.....	.1900	.....
4 detached	8.54895	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.1452	.....	.....	.....	.....
3 detached	7.15345	.....	.....	.....	.....

Muzzle Slice.

Interior diameter, 4″.22. Exterior diameter, 8″.72.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.3750	4.3788	4.37665
2	5.1469	5.1432	5.14505
2	7.1548	7.1546	7.1547
4	8.5488	8.5531	8.5507

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.3789	4.3820	4.38045
2	5.1459	5.1421	5.1440
3	7.1542	7.1536	7.1539
4 detached	8.5425	8.5554	8.54895

RINGS ALL DETACHED.

2 detached	5.1465	5.1439	5.1452
3 detached	7.1540	7.1529	7.15845

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0039	+.0037	+.0038
2 in slice	−.0010	−.0011	−.00105
3 in slice	−.0006	−.0010	−.0008
4 detached	−.0058	+.0023	−.00175

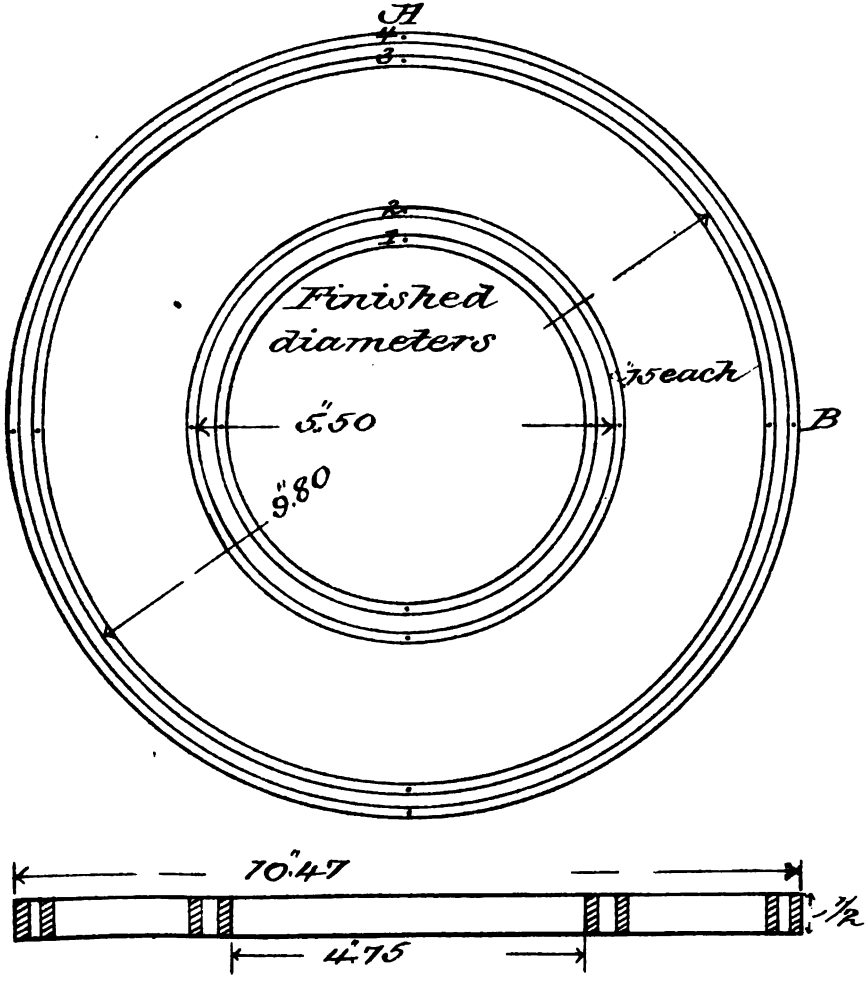
SECOND TO THIRD PHASE.

2 detached	+.0006	+.0018	+.0012
3 detached	−.0002	−.0007	−.00045

FIRST TO THIRD PHASE.

2 detached	−.0004	+.0007	+.00015
3 detached	−.0008	−.0017	−.00125

5-inch R. F. Gun Tube.
Marks 77249 B1
Breech Slice.



No. 11249 B_1.

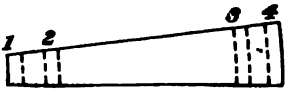
Second treatment.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

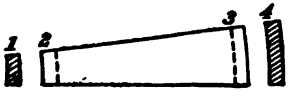
SLICE INTACT.

Interior diameter of slice, 4″.75. Exterior diameter, 10″.47.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.90585		.00575		35,200
2	5.6607		.00315		16,700
3	9.6613	.0084		10,600	
4	10.2644	.00275		8,000	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.9116				
2	5.65895		.0049		26,000
3	9.6602	.0023		7,100	
4 detached	10.26165				

RINGS ALL DETACHED.

2 detached	5.66385				
3 detached	9.6579				

Breech Slice.

Interior diameter, 4″.75. Exterior diameter, 10″.47.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9055	4.9062	4.90585
2	5.6582	5.6582	5.6607
3	9.6621	9.6605	9.6613
4	10.2628	10.2660	10.2644

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9109	4.9123	4.9116
2	5.6611	5.6568	5.65895
3	9.6610	9.6594	9.6602
4 detached	10.2670	10.2568	10.26165

RINGS ALL DETACHED.

2 detached	5.6667	5.6610	5.66385
3 detached	9.6582	9.6576	9.6579

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0054	+.0061	+.00575
2 in slice	−.0021	−.0014	−.00175
3 in slice	−.0011	−.0011	−.0011
4 detached	+.0042	−.0097	−.00275

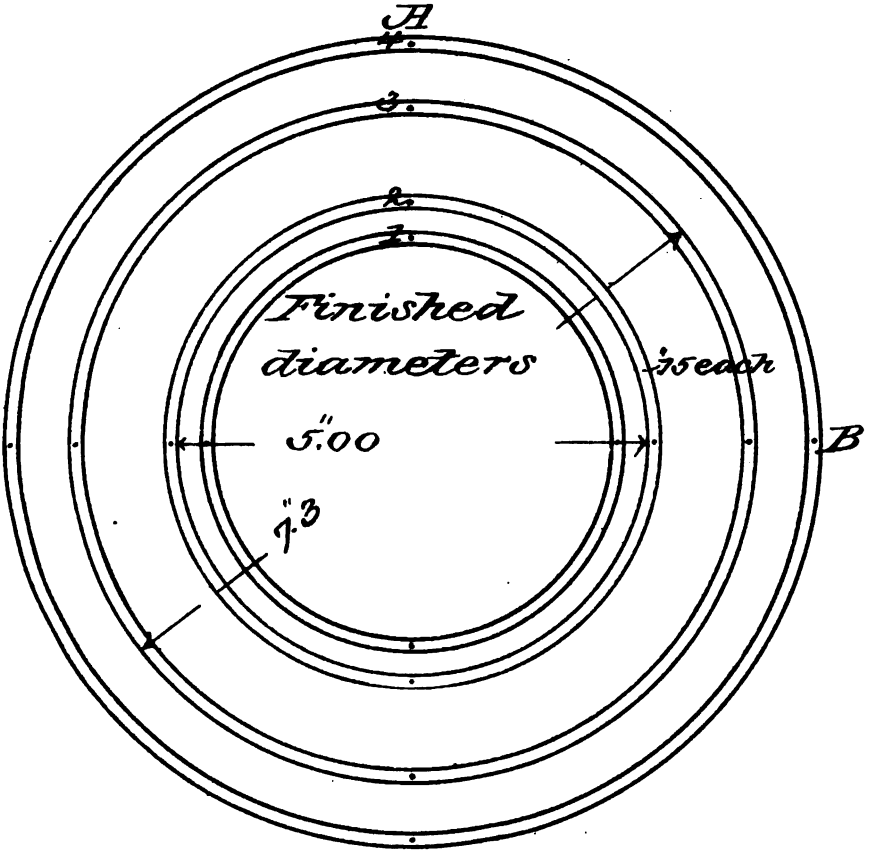
SECOND TO THIRD PHASE.

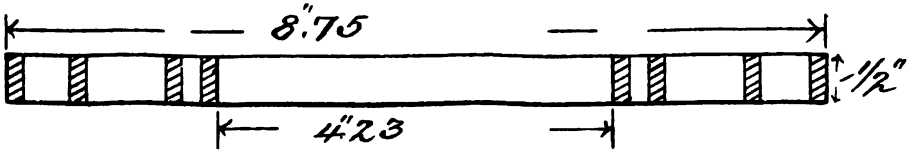
2 detached	+.0056	+.0042	+.0049
3 detached	−.0028	−.0018	−.0023

FIRST TO THIRD PHASE.

2 detached	+.0085	+.0028	+.00815
3 detached	−.0039	−.0029	−.0034

5-inch R.F. Gun Tube.
Marks 77249 B_1
Muzzle Stice.





No. 11249 B_1.

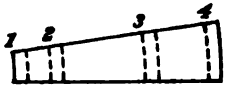
Second treatment.

MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.23. Exterior diameter, 8″.75.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.3964	.....	.0048	.....	32,700
2	5.1600	.....	.00155	.....	9,000
3	7.16795	.00205	.....	8,600	.....
4	8.5659	.....	.0014	.....	4,900

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″. Exterior diameter, 7″.3.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.4012	.....	.....	.....	.....
2	5.15905	.....	.0025	.....	14,500
3	7.1673	.0014	.....	5,900	.....
4 detached	8.5673	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.16155	.....	.....	.....	.....
3 detached	7.1659	.....	.....	.....	.....

Muzzle Slice.

Interior diameter, 4″.23. Exterior diameter, 8″.75.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.3924	4.4004	4.3964
2	5.1606	5.1594	5.1600
3	7.1708	7.1656	7.16795
4	8.5640	8.5678	8.5659

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.3972	4.4052	4.4012
2	5.1597	5.1584	5.15905
3	7.1696	7.1650	7.1673
4 detached	8.5664	8.5682	8.5673

RINGS ALL DETACHED.

2 detached	5.1614	5.1617	5.16155
3 detached	7.1690	7.1628	7.1659

Muzzle strains released.

Rings.	Diameters.		
	A.	B,	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	+.0048	+.0048	+.0048
2 in slice	−.0009	−.0010	−.00095
3 in slice	−.0007	−.0006	−.00065
4 detached	+.0024	+.0004	+.0014

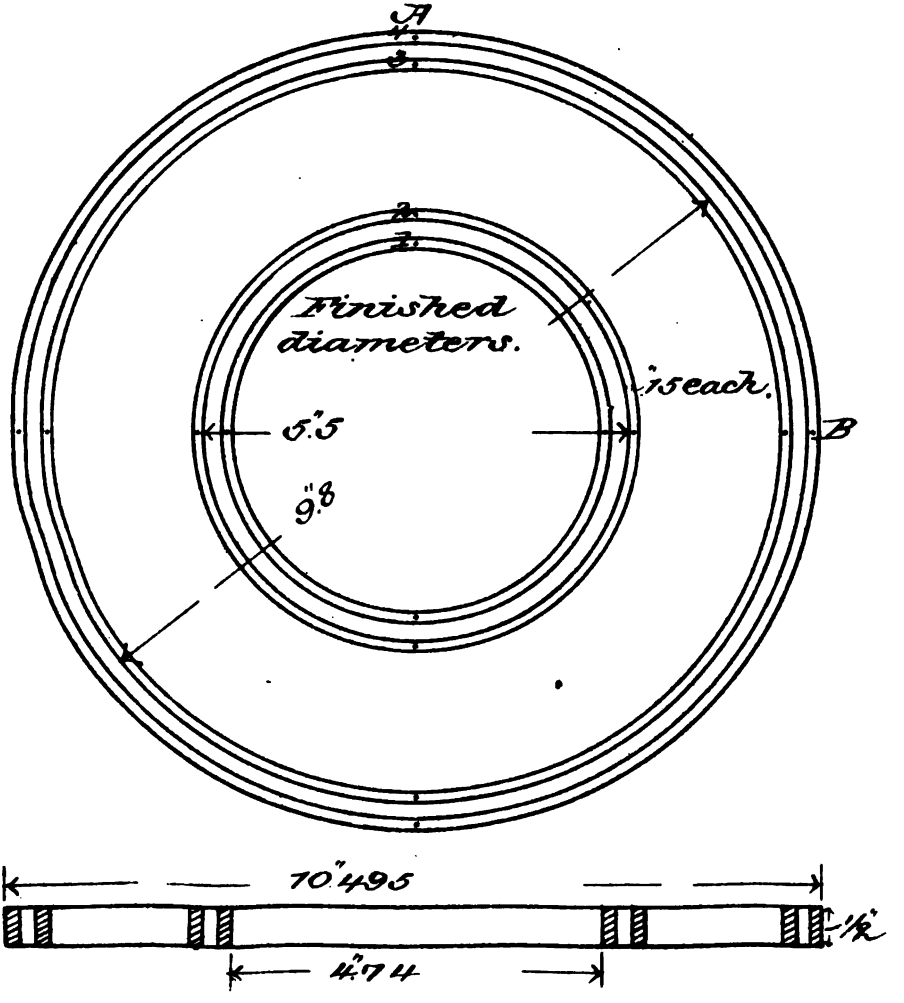
SECOND TO THIRD PHASE.

2 detached	+.0017	+.0033	+.0025
3 detached	−.0006	−.0022	−.0014

FIRST TO THIRD PHASE.

2 detached	+.0008	+.0023	+.00155
3 detached	−.0013	−.0028	−.00205

5-inch R.F. Gun Tube.
Marks 77249 B 3.
Breech Slice.



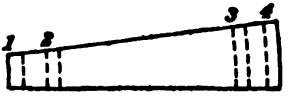
No. 11249 B_3.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

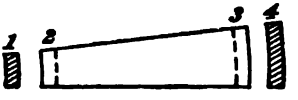
SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.495.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.8973	.....	.00685	.....	32,800
2	5.6368	.....	.00265	.....	14,100
3	9.6468	.00195	.....	6,100	.....
4	10.3211	.0010	.....	2,900	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.80.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.90265	.....	.....	.....	.....
2	5.63535	.....	.0041	.....	21,880
3	9.6459	.00105	.....	3,800	.....
4 detached	10.3201	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.63945	.....	.....	.....	.....
3 detached	9.64485	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.495.
Original diameter of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.8996	4.8950	4.8973
2	5.6390	5.6346	5.6368
3	9.6477	9.6459	9.6468
4	10.3177	10.3245	10.3211

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9054	4.8999	4.90265
2	5.6375	5.6332	5.63585
3	9.6469	9.6449	9.6459
4 detached	10.3246	10.3156	10.3201

RINGS ALL DETACHED.

2 detached	5.6415	5.6374	5.63945
3 detached	9.6451	9.6446	9.64485

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0058	+.0049	+.00535
2 in slice	−.0015	−.0014	−.00145
3 in slice	−.0008	−.0010	−.0009
4 detached	+.0069	−.0089	−.0010

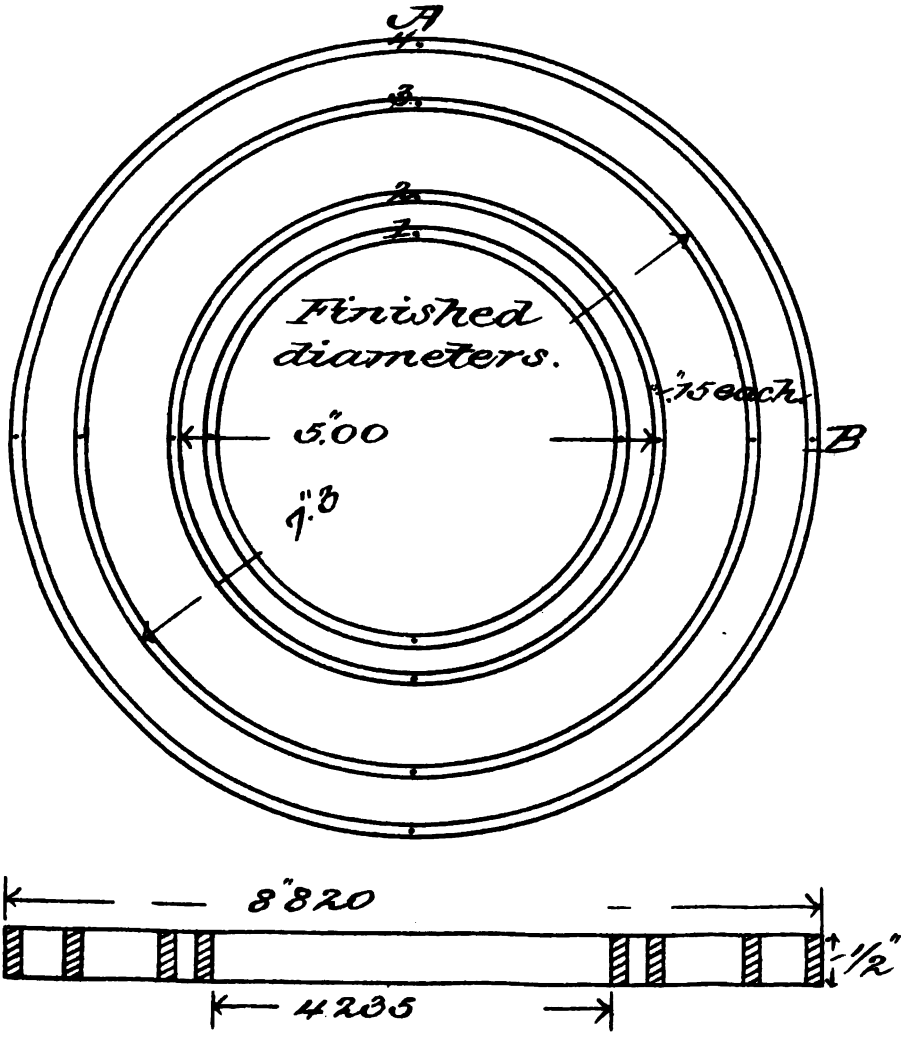
SECOND TO THIRD PHASE.

2 detached	+.0040	+.0042	+.0041
3 detached	−.0018	−.0008	−.00105

FIRST TO THIRD PHASE.

2 detached	+.0025	+.0028	+.00265
3 detached	−.0026	−.0013	−.00195

5-inch R.F. Gun Tube.
Marks 77249 B3.
Muzzle Slice.



No. 11249 B_3.

Muzzle Slice.

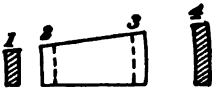
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.235. Exterior diameter, 8″.820.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.39655	.....	.00415	.....	28,300
2	5.1543	.....	.00095	.....	5,500
3	7.1558	.00115	.....	4,800	.....
4	8.64175	.00165	.....	5,700	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.4007	.....	.....	.....	.....
2	5.1536	.....	.00165	.....	9,600
3	7.15555	.0009	.....	3,700	.....
4 detached	8.6401	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.15525	.....	.....	.....	.....
3 detached	7.15465	.....	.....	.....	.....

Muzzle Slice.

Interior diameter, 4″.235. Exterior diameter, 8″.820.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.3961	4.3970	4.39655
2	5.1517	5.1569	5.1543
3	7.1575	7.1541	7.1558
4	8.6447	8.6388	8.64175

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4000	4.4014	4.4007
2	5.1510	5.1562	5.1536
3	7.1574	7.1537	7.15555
4 detached	8.6405	8.6397	8.6401

RINGS ALL DETACHED.

2 detached	5.1520	5.1585	5.15525
3 detached	7.1565	7.1528	7.15465

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0089	+.0044	+.00415
2 in slice	−.0007	−.0007	−.0007
3 in slice	−.0001	−.0004	−.00025
4 detached	−.0042	+.0009	−.00165

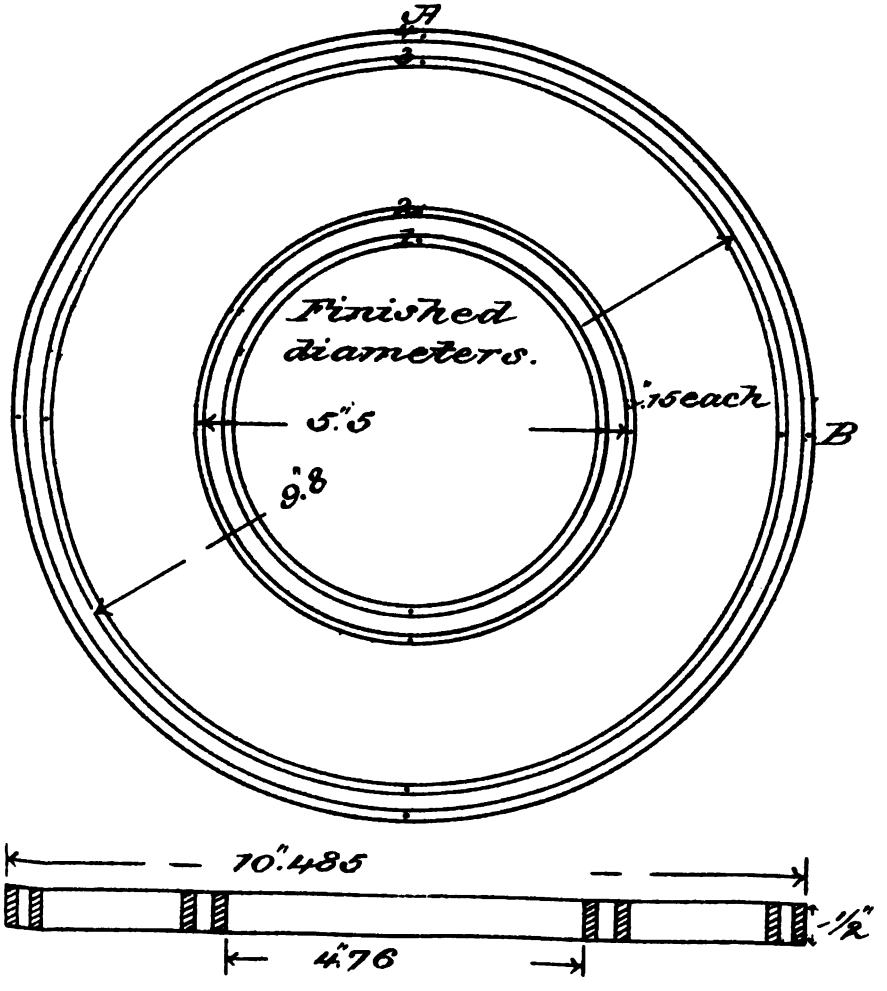
SECOND TO THIRD PHASE.

2 detached	+.0010	+.0023	+.00165
3 detached	−.0009	−.0009	−.0009

FIRST TO THIRD PHASE.

2 detached	+.0003	+.0016	+.00095
3 detached	−.0010	−.0018	−.00115

6-inch R.F. Gun Tube.
Marks 11272 B_1.
Breech Slice.



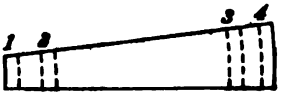
No. 11272, B_1.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

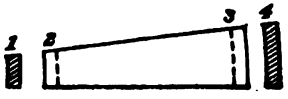
SLICE INTACT.

Interior diameter of slice, 4″.76. Exterior diameter, 10″.485.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds*
1	4.92005		.00525		32,000
2	5.63835		.0022		11,700
3	9.6357	.0022		6,800	
4	10.2990	.0029		8,400	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.9253				
2	5.6371		.00845		18,400
3	9.63505	.00155		4,800	
4 detached	10.2961				

RINGS ALL DETACHED.

2 detached	5.64055				
3 detached	9.6385				

Breech Slice.

Interior diameter, 4″.76. Exterior diameter, 10″.485.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9237	4.9164	4.92005
2	5.6407	5.6360	5.63835
3	9.6380	9.6334	9.6357
4	10.3085	10.2945	10.2990

Rings 1 and 4 detached, rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9291	4.9215	4.9253
2	5.6395	5.6347	5.6371
3	9.6375	9.6326	9.63505
4 detached	10.2960	10.2962	10.2961

RINGS ALL DETACHED.

2 detached	5.6424	5.6387	5.64055
3 detached	9.6370	9.6300	9.6335

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0054	+.0051	+.00525
2 in slice	−.0012	−.0013	−.00125
3 in slice	−.0005	−.0008	−.00065
4 detached	−.0075	+.0017	−.0029

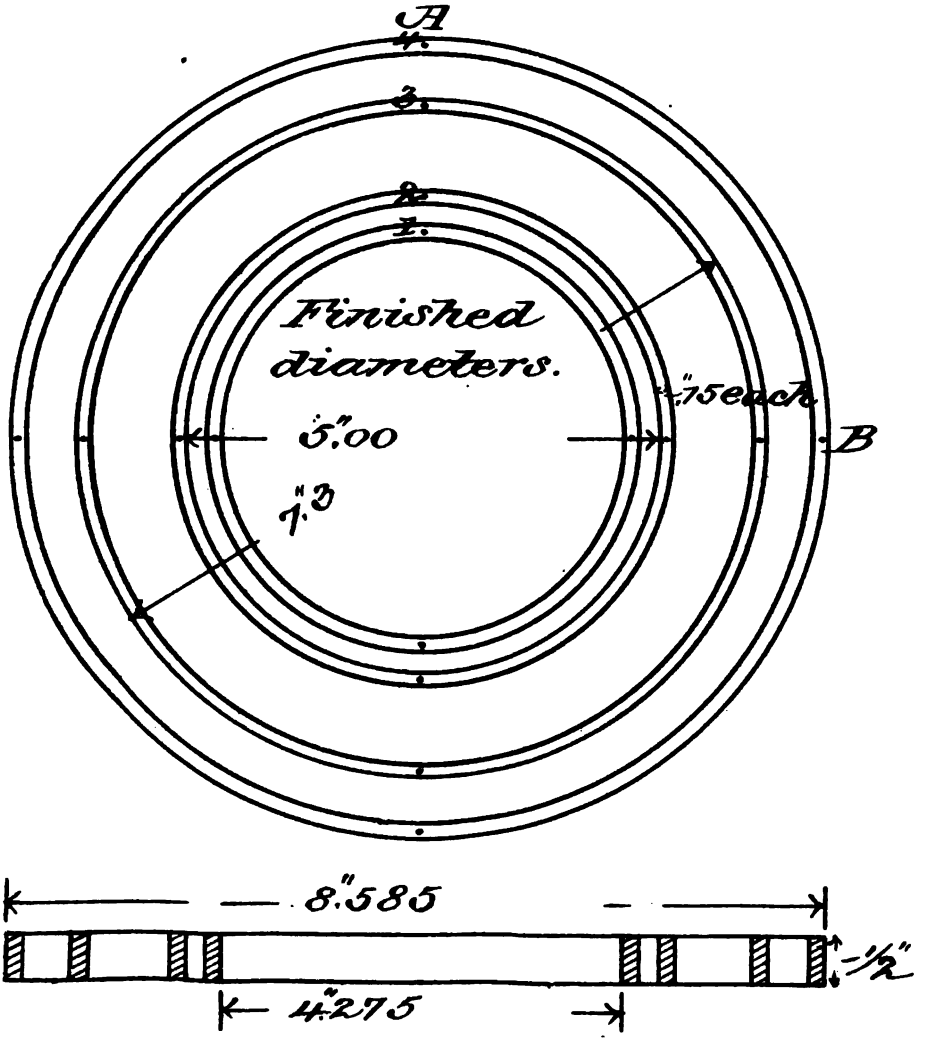
SECOND TO THIRD PHASE.

2 detached	+.0029	+.0040	+.00345
3 detached	−.0005	−.0026	−.00155

FIRST TO THIRD PHASE.

2 detached	+.0077	+.0027	+.0022
3 detached	−.0010	−.0034	−.0022

5-inch R.F. Gun Tube.
Marks 11272 B, .
Muzzle Slice.



No. 11272 B_1.

MUZZLE SLICE.

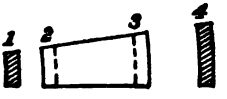
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.275. Exterior diameter, 8″.585.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.42795		.00325		22,000
2	5.1464		.0014		8,200
3	7.1450	.0010		4,100	
4	8.4044	.0017		6,100	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.4312				
2	5.1454		.0024		14,000
3	7.1444	.0004		1,700	
4 detached	8.4027				

RINGS ALL DETACHED.

2 detached	5.1478				
3 detached	7.1440				

Muzzle Slice.

Interior diameter, 4″.275. Exterior diameter, 8″.585.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4250	4.4309	4.42795
2	5.1455	5.1473	5.1464
3	7.1463	7.1473	7.1450
4	8.4087	8.4001	8.4044

Rings 1 and 4 detached. Rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4284	4.4340	4.4312
2	5.1446	5.1462	5.1454
3	7.1459	7.1429	7.1444
4 detached	8.4029	8.4025	8.4027

RINGS ALL DETACHED.

2 detached	5.1470	5.1486	5.1478
3 detached	7.1463	7.1417	7.1440

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0084	+.0081	+.00825
2 in slice	−.0009	−.0011	−.0010
3 in slice	−.0004	−.0008	−.0006
4 detached	−.0058	+.0024	−.0017

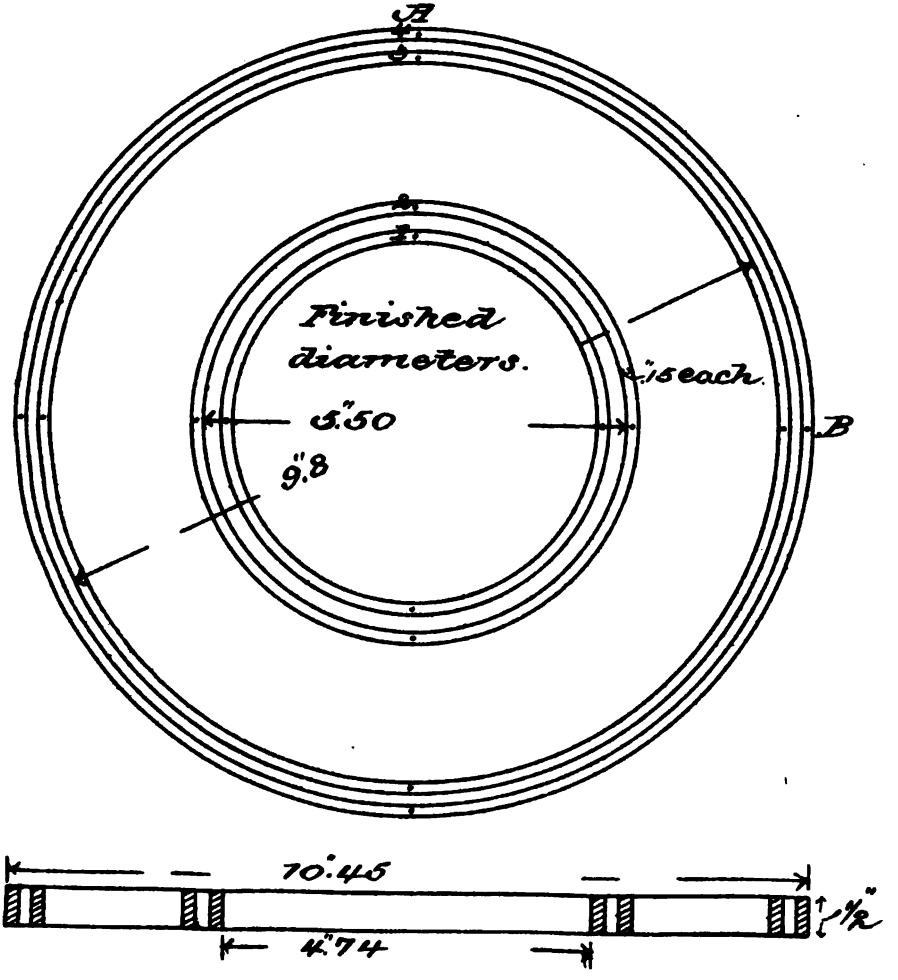
SECOND TO THIRD PHASE.

2 detached	+.0024	+.0024	+.0024
3 detached	+.0004	−.0012	−.0004

FIRST TO THIRD PHASE.

2 detached	+.0015	+.0013	+.0014
3 detached	.0000	−.0020	−.0010

6-inch R.F. Gun Tube.
Marks 11,272 B3.
Breech Slice.



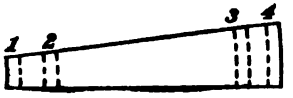
No. 11272 B_2.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

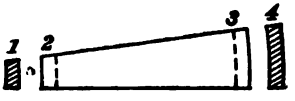
SLICED INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.45.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.90225	.....	.0043	.....	26,300
2	5.65206	.....	.00275	.....	14,600
3	9.6368	.0082	.....	10,000	.....
4	10.29675	.0010	.....	2,900	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.5. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.90655	.....	.....	.....	.....
2	5.6509	.....	.0089	.....	20,700
3	9.63605	.00245	.....	7,600	.....
4 detached	10.29675	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.6548	.....	.....	.....	.....
3 detached	9.6336	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.45.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9025	4.9020	4.90225
2	5.6517	5.6524	5.65205
3	9.6379	9.6357	9.6368
4	10.2986	10.2999	10.29675

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9075	4.9056	4.90655
2	5.6508	5.6510	5.6509
3	9.6371	9.6350	9.63605
4 detached	10.2890	10.3085	10.29575

RINGS ALL DETACHED.

2 detached	5.6551	5.6545	5.6548
3 detached	9.6850	9.6822	9.6836

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0050	+.0036	+.0043
2 in slice	−.0009	−.0014	−.00115
3 in slice	−.0008	−.0007	−.00075
4 detached	−.0106	+.0086	−.0010

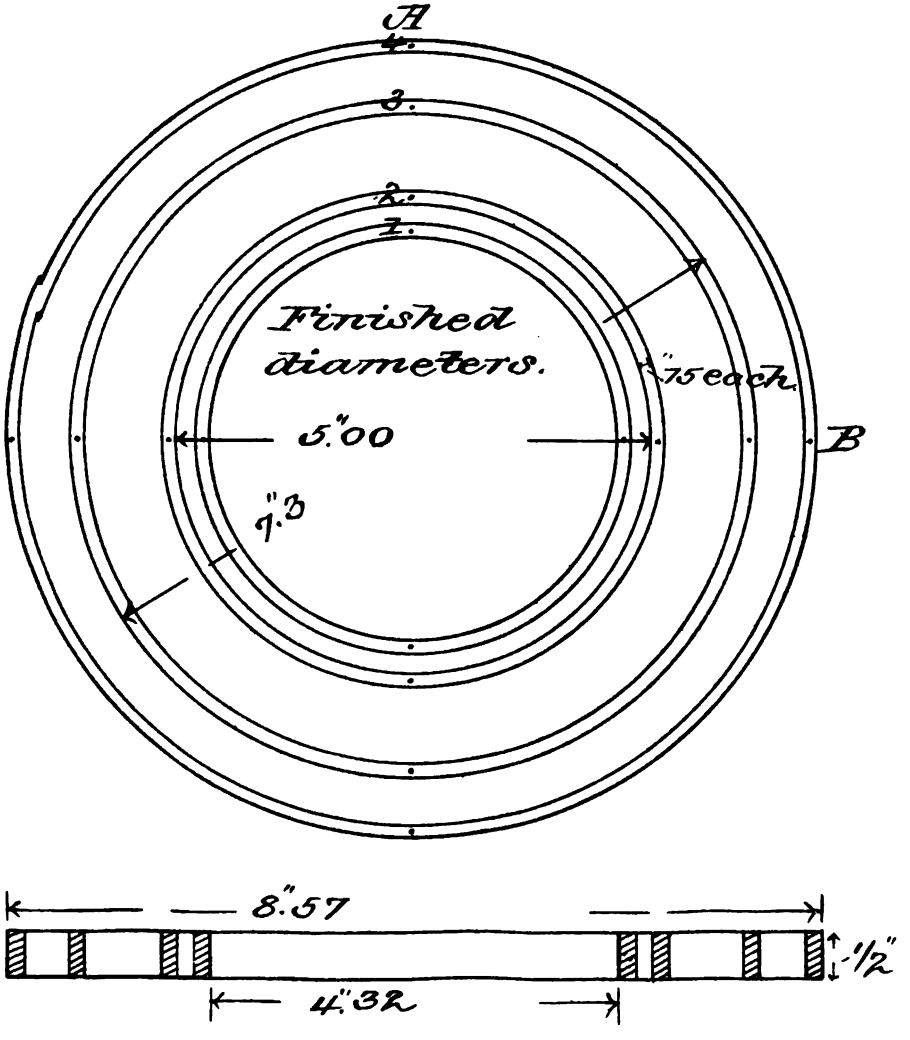
SECOND TO THIRD PHASE.

2 detached	+.0043	+.0035	+.0039
3 detached	−.0021	−.0028	−.00245

FIRST TO THIRD PHASE.

2 detached	+.0034	+.0021	+.00275
3 detached	−.0029	−.0035	−.0032

5-inch R. F. Gun Tube.
Marks 11272 B2.
Muzzle Slice.



No. 11272 B_2.

Muzzle Slice.

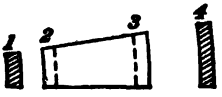
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.32. Exterior diameter, 8″.57.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	8.4642	.....	.00425	.....	15,100
2	5.14855	.....	.0017	.....	9,900
3	7.1485	.00215	.....	9,000	.....
4	8.4139	.00255	.....	9,100	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.46845	.....	.....	.....	.....
2	5.1480	.....	.00225	.....	13,100
3	7.1480	.00165	.....	6,900	.....
4 detached	8.41135	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.15025	.....	.....	.....	.....
3 detached	7.14635	.....	.....	.....	.....

Muzzle Slice.

Interior diameter, 4″.32. Exterior diameter, 8″.57.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4646	4.4638	4.4642
2	5.1501	5.1470	5.14855
3	7.1515	7.1455	7.1485
4	8.4185	8.4093	8.4139

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4691	4.4678	4.46845
2	5.1494	5.1466	5.1480
3	7.1506	7.1454	7.1480
4 detached	8.4225	8.4002	8.41135

RINGS ALL DETACHED.

2 detached	5.1514	5.1491	5.15025
3 detached	7.1497	7.1490	7.14935

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0045	+.0040	+.00425
2 in slice	−.0007	−.0004	−.00055
3 in slice	−.0009	−.0001	−.0005
4 detached	+.0040	−.0091	−.00255

SECOND TO THIRD PHASE.

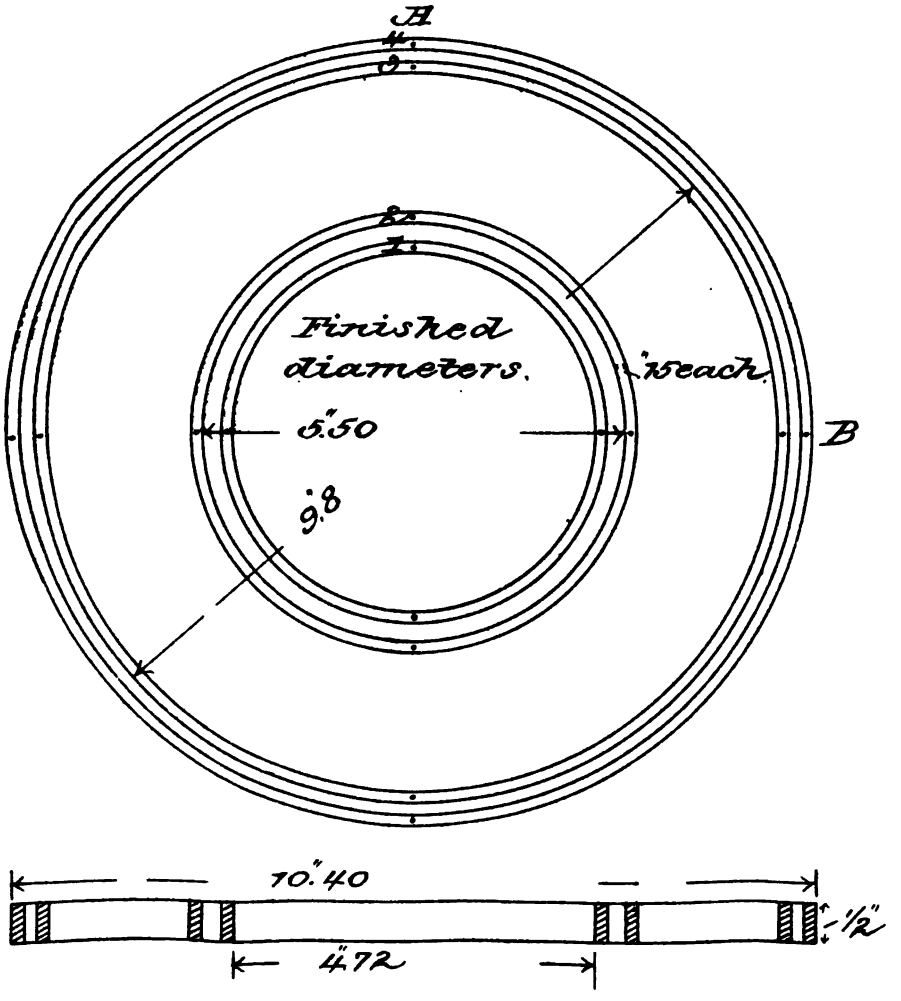
2 detached	+.0020	+.0025	+.00225
3 detached	−.0009	−.0024	−.00165

FIRST TO THIRD PHASE.

2 detached	+.0013	+.0021	+.0017
3 detached	−.0018	−.0024	−.00215

5-inch R.F. Gun Tube
Accepted tube 11272 B_2.

Breech Slice, annealed.

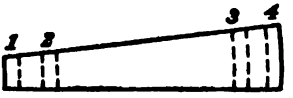


No. 11272 B_2.

Breech slice, annealed at temperature of 1,000° F.
State of internal strains and stresses at different phases of the slice.

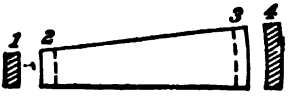
SLICE INTACT.

Interior diameter of slice, 4″.72. Exterior diameter, 10″.40.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.8812		.0009		5,500
2	5.65095		.0010		5,300
3	9.6870	.00025		800	
4	10.2468		.00075		2,200

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.8821				
2	5.6509		.00105		5,600
3	9.6369	.00015		500	
4 detached	10.24755				

RINGS ALL DETACHED.

2 detached	5.65195				
3 detached	9.63675				

Breech Slice, Annealed at Temperature of 1000° F.

Interior diameter, 4″.72. Exterior diameter, 10″.40.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.8856	4.8768	4.8812
2	5.6490	5.6529	5.65095
3	9.6389	9.6351	9.6370
4	10.2450	10.2486	10.2468

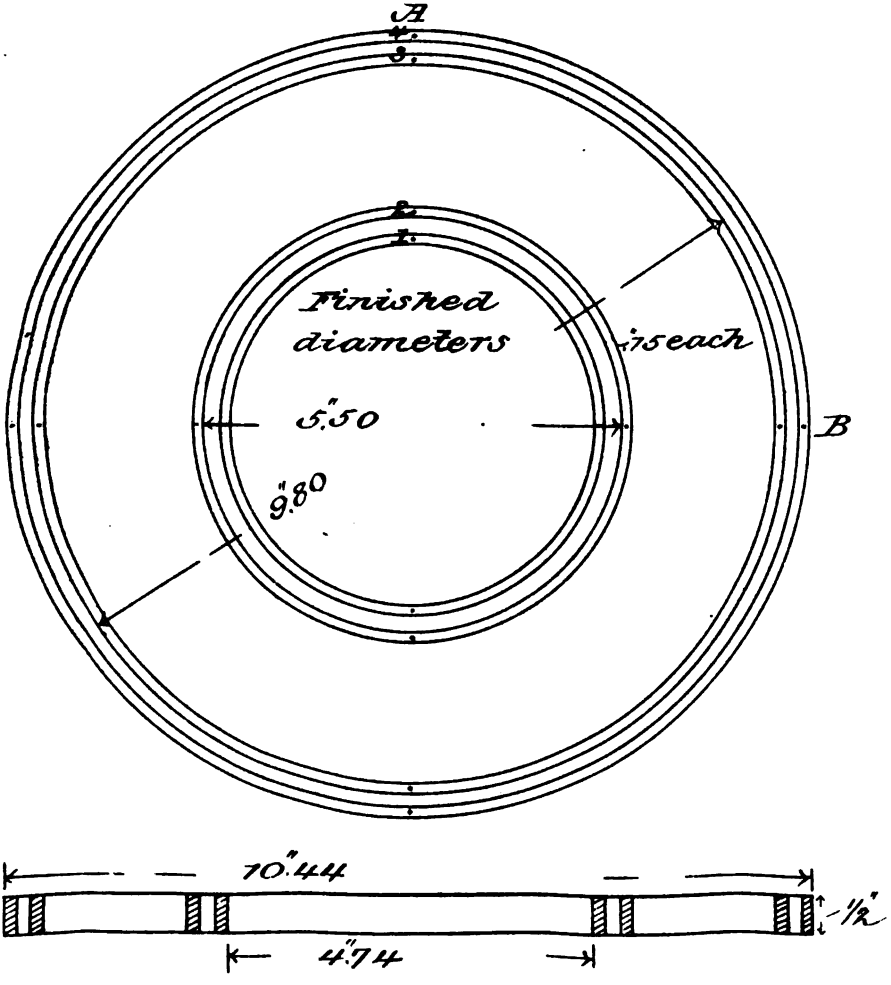
Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.8867	4.8775	4.8821
2	5.6489	5.6529	5.6509
3	9.6388	9.6350	9.6369
4 detached	10.2564	10.2387	10.24755
RINGS ALL DETACHED.			
2 detached	5.6499	5.6540	5.65195
3 detached	9.6410	9.6325	9.63675

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0011	+.0007	+.0009
2	—.0001	.0000	—.00005
3	—.0001	—.0001	—.0001
4 detached	+.0114	—.0099	+.00075
SECOND TO THIRD PHASE.			
2 detached	+.0010	+.0011	+.00105
3 detached	+.0022	—.0025	—.00015
FIRST TO THIRD PHASE.			
2 detached	+.0009	+.0011	+.0010
3 detached	+.0021	—.0026	—.00025

5-inch R.F. Gun Tube.
Marks 11272 B3.
Breech Slice.



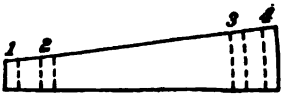
No. 11272 B_3.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

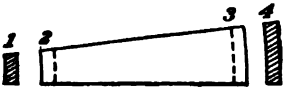
SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.44.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.90645	.....	.0082	.....	19,600
2	5.6608	.....	.0010	.....	5,300
3	9.65196	.0010	.....	3,200	.....
4	10.2738	.0002	.....	600	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.90865	.....	.....	.....	.....
2	5.65925	.....	.00205	.....	10,900
3	9.65115	.0002	.....	600	.....
4 detached	10.2736	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.6613	.....	.....	.....	.....
3 detached	9.65095	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4".74. Exterior diameter 10".44.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9058	4.9051	4.90545
2	5.6573	5.6638	5.6606
3	9.6520	9.6519	9.65195
4	10.2714	10.2762	10.2738

Rings 1 and 4 detached. Rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9081	4.9092	4.90865
2	5.6561	5.6624	5.65925
3	9.6512	9.6511	9.65115
4 detached	10.2804	10.2668	10.2736

RINGS ALL DETACHED.

2 detached	5.6576	5.6650	5.6613
3 detached	9.6506	9.6513	9.65095

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0023	+.0041	+.0032
2 in slice	−.0012	−.0009	−.00105
3 in slice	−.0008	−.0008	−.0008
4 detached	+.0090	−.0094	−.0002

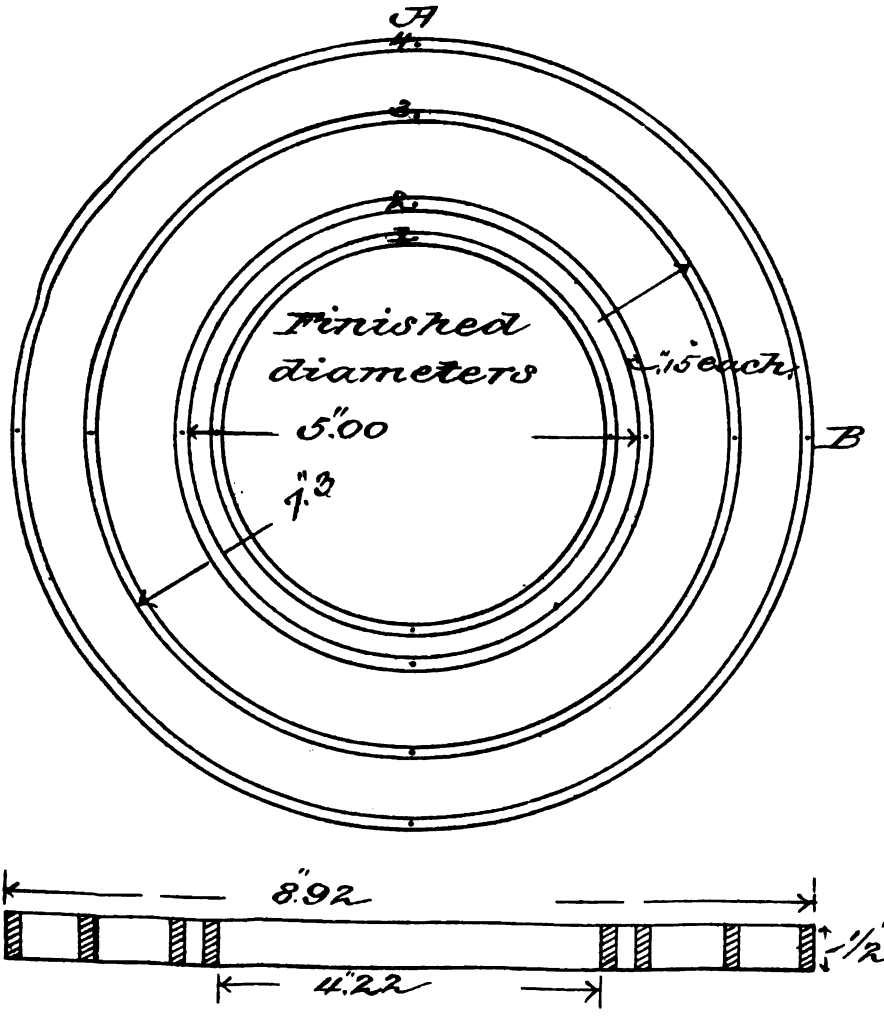
SECOND TO THIRD PHASE.

2 detached	+.0015	+.0026	+.00205
3 detached	−.0006	+.0002	−.0002

FIRST TO THIRD PHASE.

2 detached	+.0008	+.0017	+.0010
3 detached	−.0014	−.0006	−.0010

5-inch R. F. Gun Tube.
Mark 8 11,272 B 3.
Muzzle Slice.



No. 11272 B_3.

MUZZLE SLICE.

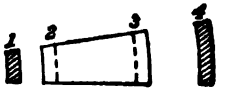
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4".22. Exterior diameter, 8".92.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.4067	.....	.00305	.....	20,800
2	5.15585	.....	.00075	.....	4,400
3	7.15015	.0008	.....	8,400	.....
4	8.75245	.00125	.....	4,800	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5".00. Exterior diameter, 7".3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.40975	.....	.....	.....	.....
2	5.15525	.....	.00135	.....	7,800
3	7.1496	.00025	.....	1,000	.....
4 detached	8.7512	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.1566	.....	.....	.....	.....
3 detached	7.14985	.....	.....	.....	.....

Muzzle Slice.

Interior diameter, 4″.22. Exterior diameter, 8″.92.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.4072	4.4062	4.4067
2	5.1526	5.1591	5.15585
3	7.1458	7.1545	7.15015
4	8.7541	8.7508	8.75245

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.4107	4.4088	4.40975
2	5.1524	5.1581	5.15525
3	7.1455	7.1537	7.1496
4 detached	8.7464	8.7560	8.7512

RINGS ALL DETACHED.

2 detached	5.1536	5.1596	5.1566
3 detached	7.1454	7.1588	7.14985

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0085	+.0026	+.00805
2 in slice	−.0002	−.0010	−.0006
3 in slice	−.0008	−.0008	−.00055
4 detached			

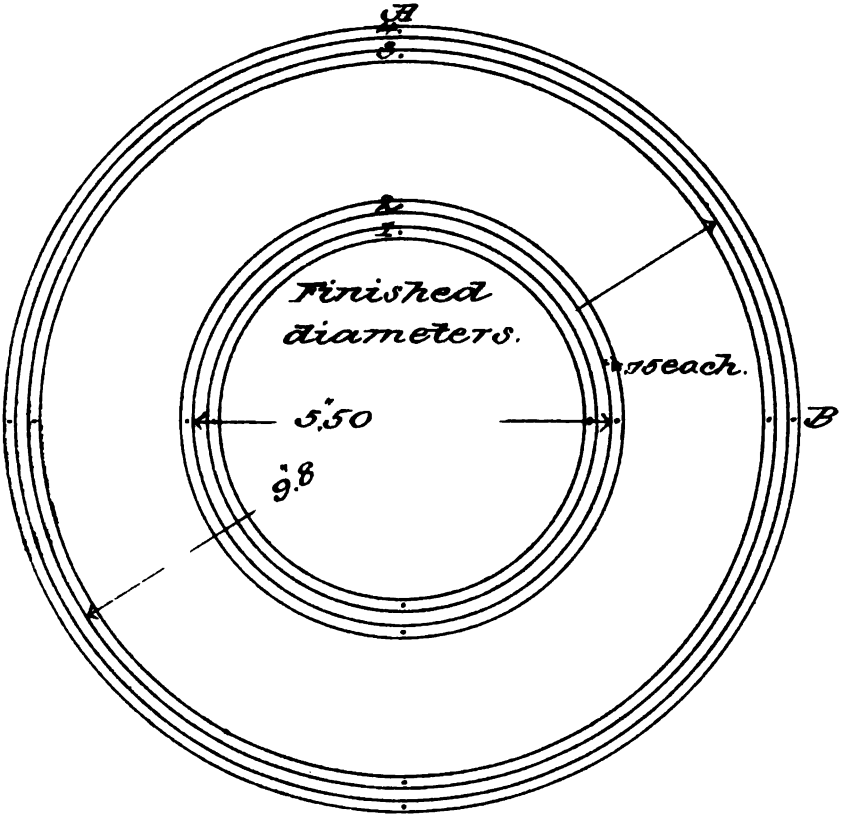
SECOND TO THIRD PHASE.

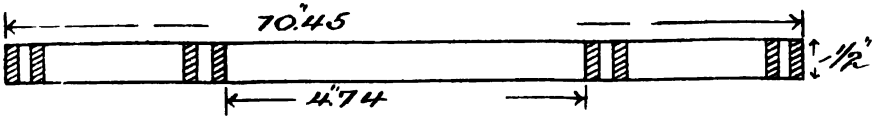
2 detached	+.0012	+.0015	+.00135
3 detached	−.0001	−.0004	−.00025

FIRST TO THIRD PHASE.

2 detached	+.0010	+.0005	+.00075
3 detached	−.0004	−.0012	−.0008

5-inch R. F. Gun Tube.
Mark 7 1272 B 2.
Breech Slice.





No. 11272 B_3.

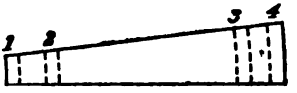
(Second treatment.)

BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

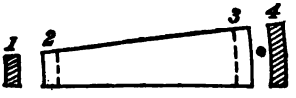
SLICE INTACT.

Interior diameter of slice, 4″.74. Exterior diameter, 10″.45.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.89595		.00655		40,100
2	5.65695		.00485		25,700
3	9.6434	.0058		18,000	
4	10.27355	.00485		14,160	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.9025				
2	5.65545		.00635		33,700
3	9.64235	.00475		14,800	
4 detached	10.2685				

RINGS ALL DETACHED.

2 detached	5.6618				
3	9.6376				

Breech Slice.

Interior diameter, 4″.74. Exterior diameter, 10″.45.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.8969	4.8950	4.89595
2	5.6560	5.6579	5.65695
3	9.6432	9.6436	9.6434
4	10.2743	10.2724	10.27335

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9038	4.9012	4.9025
2	5.6544	5.6565	5.65545
3	9.6421	9.6426	9.64235
4 detached	10.2689	10.2681	10.2685

RINGS ALL DETACHED.

2 detached	5.6607	5.6629	5.6618
3 detached	9.6381	9.6371	9.6376

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0069	+.0062	+.00655
2 in slice	−.0016	−.0014	−.0015
3 in slice	−.0011	−.0010	−.00105
4 detached	−.0054	−.0043	−.00485

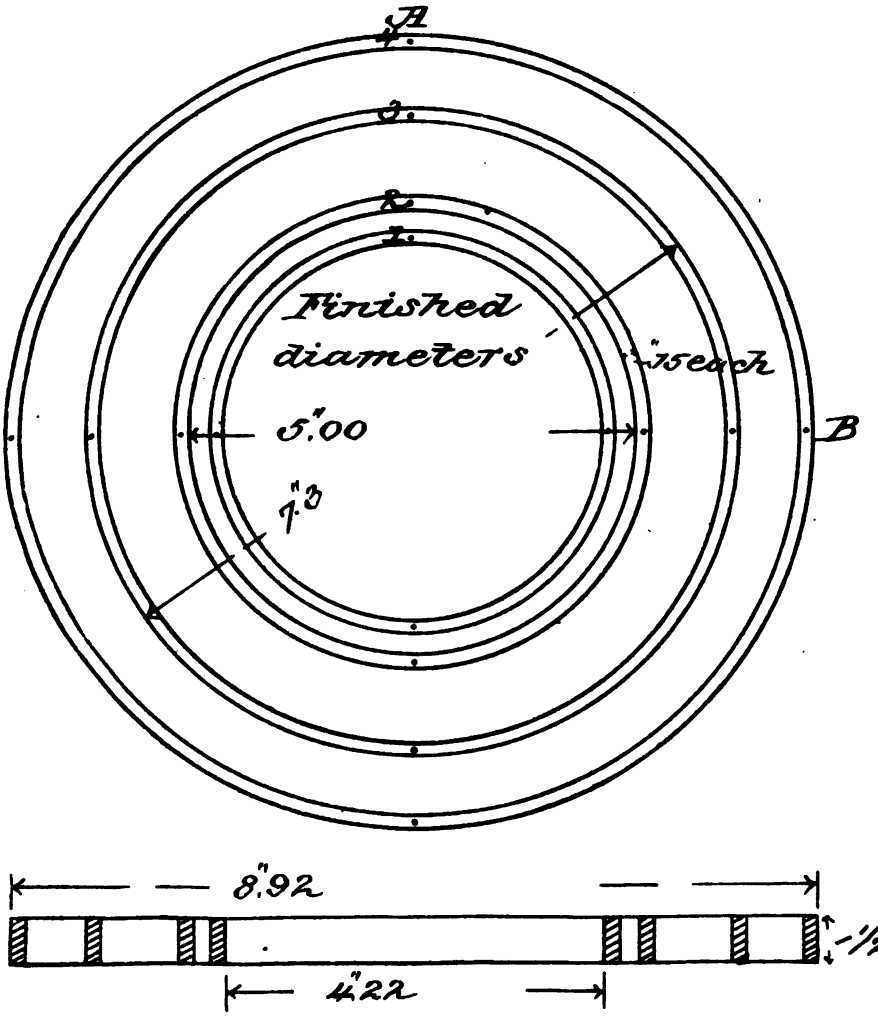
SECOND TO THIRD PHASE.

2 detached	+.0063	+.0064	+.00635
3 detached	−.0040	−.0055	−.00475

FIRST TO THIRD PHASE.

2 detached	+.0047	+.0050	+.00485
3 detached	−.0051	−.0065	−.0058

5-inch R.F. Gun Tube.
Marks 11272 B3.
Muzzle Slice.



No. 11272 B_3.

(Second treatment.)

MUZZLE SLICE.

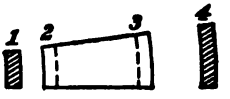
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4".22. Exterior diameter, 8".92.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.38315	.....	.0058	.....	39,700
2	5.1487	.....	.0043	.....	25,100
3	7.14875	.0038	.....	15,900	.....
4	8.7731	.00255	.....	8,700	.....

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5".00. Exterior diameter, 7".3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.38896	.....	.....	.....	.....
2	5.14855	.....	.00445	.....	25,900
3	7.14905	.0041	.....	17,200	.....
4 detached	8.77065	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.1530	.....	.....	.....	.....
3 detached	7.14495	.....	.....	.....	.....

Muzzle Slice.

Interior diameter, 4″.22. Exterior diameter, 8″.92.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.3804	4.3859	4.38315
2	5.1468	5.1511	5.1487
3	7.1454	7.1521	7.14875
4	8.7757	8.7705	8.7731

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.3849	4.3980	4.38995
2	5.1465	5.1506	5.14855
3	7.1460	7.1521	7.14905
4 detached	8.7635	8.7776	8.77055

RINGS ALL DETACHED.

2 detached	5.1514	5.1546	5.1530
3 detached	7.1421	7.1478	7.14495

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0045	+.0071	+.0058
2 in slice	+.0002	−.0005	−.00015
3 in slice	+.0006	.0000	+.0003
4 detached	−.0122	+.0071	−.00255

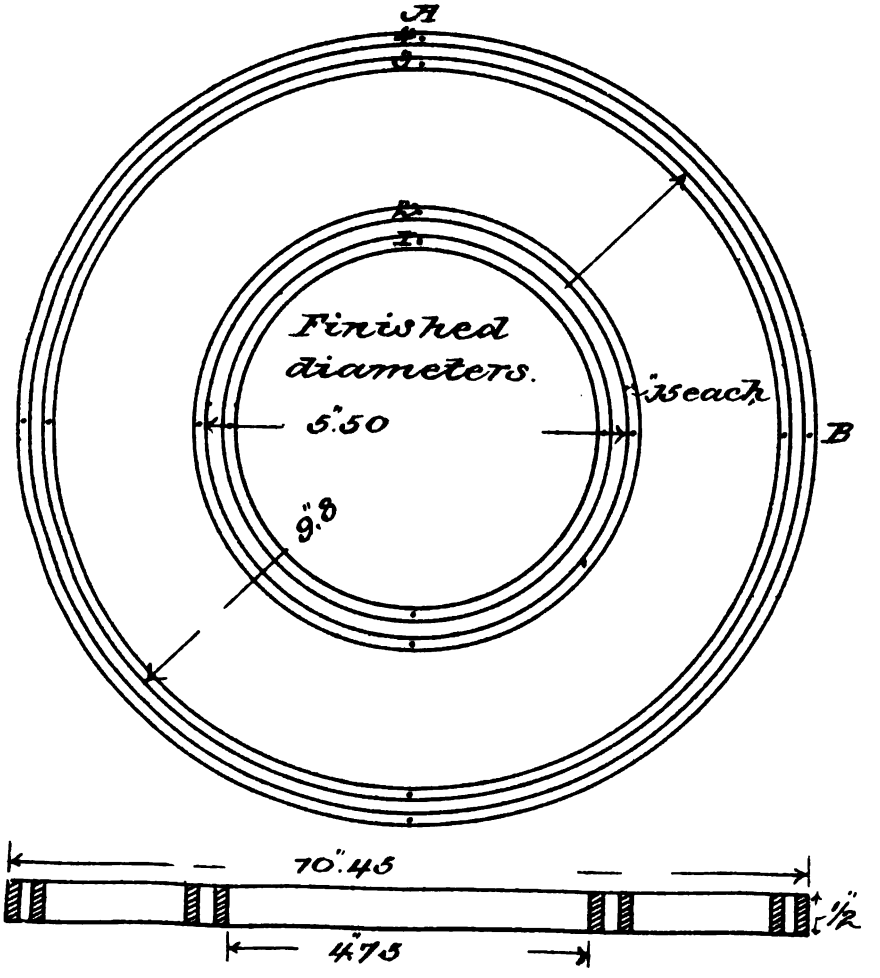
SECOND TO THIRD PHASE.

2 detached	+.0049	+.0040	+.00445
3 detached	−.0089	−.0043	−.0041

FIRST TO THIRD PHASE.

2 detached	+.0051	+.0035	+.0043
3 detached	−.0088	−.0043	−.0088

6-inch R.F. Gun Tube.
Marks 11.837 B_1
Breech Slice.



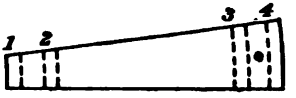
No. 11837 B_1.

Breech Slice.

State of internal strains and stresses at different phases of the slice.

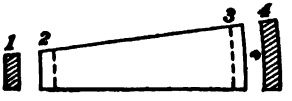
SLICE INTACT.

Interior diameter of slice, 4″.75. Exterior diameter, 10″.45.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inch.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.90115	.....	.0055	.....	33,700
2	5.65015	.....	.00215	.....	11,400
3	9.63685	.00205	.....	6,400	.....
4	10.3050	.....	.00115	.....	3,300

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 5″.50. Exterior diameter, 9″.8.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.90665	.....	.....	.....	.....
2	5.64855	.....	.00875	.....	19,900
3	9.63585	.00105	.....	3,300	.....
4 detached	10.30615	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	5.6523	.....	.....	.....	.....
3 detached	9.6348	.....	.....	.....	.....

Breech Slice.

Interior diameter, 4″.75. Exterior diameter, 10″.45.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9089	4.8984	4.90115
2	5.6492	5.6511	5.65015
3	9.6367	9.6370	9.63685
4	10.3045	10.3055	10.3050

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.9095	4.9088	4.90665
2	5.6472	5.6499	5.64855
3	9.6356	9.6361	9.63585
4 detached	10.3104	10.3019	10.30615

RINGS ALL DETACHED.

2 detached	5.6508	5.6538	5.6523
3 detached	9.6342	9.6354	9.6348

Breech strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0056	+.0054	+.0055
2 in slice	−.0020	−.0012	−.0016
3 in slice	−.0011	−.0009	−.0010
4 detached	+.0059	+.0086	+.00115

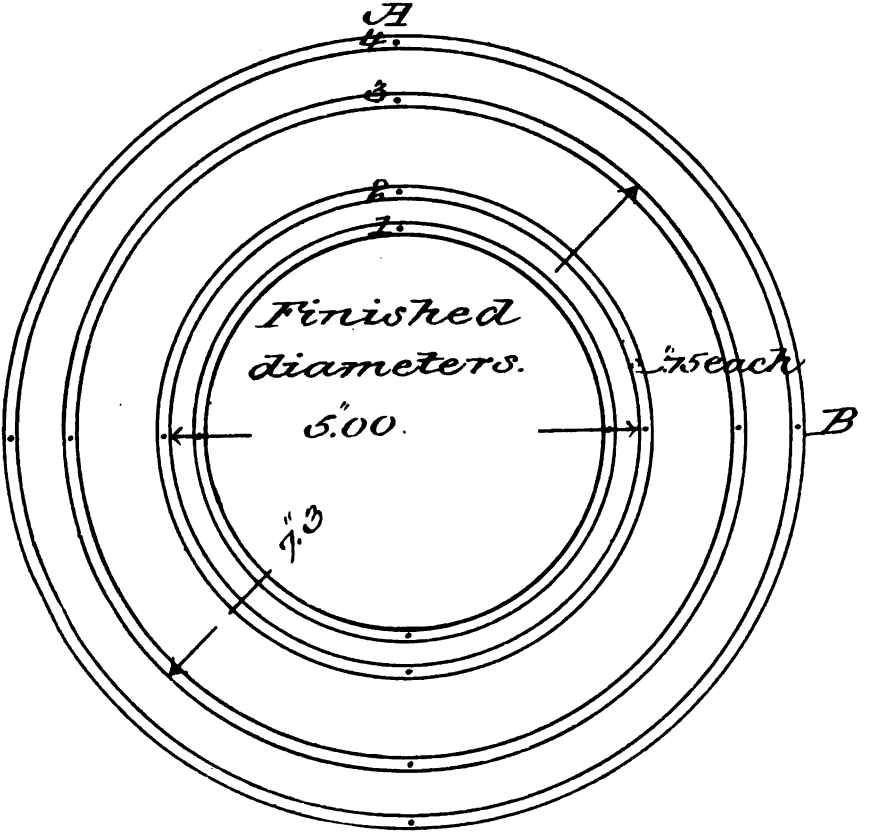
SECOND TO THIRD PHASE.

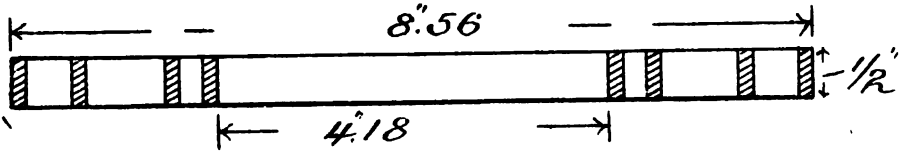
2 detached	+.0036	+.0089	+.00375
3 detached	−.0014	−.0007	−.00105

FIRST TO THIRD PHASE.

2 detached	+.0016	+.0027	+.00215
3 detached	−.0025	−.0016	−.00205

5-inch R.F. Gun Tube.
Marks 11,837 B1
Muzzle Slice.





No. 11837 B_1.

Muzzle Slice.

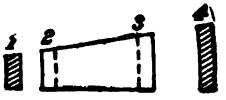
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

Interior diameter of slice, 4″.18. Exterior diameter, 8″.56.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.3474		.0043		29,600
2	5.15225	.0008		1,700	
3	7.1417	.0014		5,900	
4	8.3961	.0008		1,100	

Rings 1 and 4, detached; rings 2 and 3, in the slice.
Interior diameter of slice, 5″.00. Exterior diameter, 7″.3.



Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	4.3517				
2	5.15065		.0018		7,600
3	7.14045	.00015		600	
4 detached	8.3958				

RINGS ALL DETACHED.

2 detached	5.15195				
3 detached	7.1408				

Muzzle Slice.

Interior diameter, 4″.18. Exterior diameter, 8″.56.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.3477	4.3471	4.3474
2	5.1505	5.1540	5.15225
3	7.1425	7.1409	7.1417
4	8.3946	8.3976	8.3961

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	4.3521	4.3513	4.3517
2	5.1486	5.1527	5.15065
3	7.1410	7.1399	7.14045
4 detached	8.4047	8.3869	8.3958

RINGS ALL DETACHED.

2 detached	5.1497	5.1542	5.15195
3 detached	7.1402	7.1404	7.1403

Muzzle strains released.

Rings.	Diameters.		
	A.	B.	Mean.
	Inch.	*Inch.*	*Inch.*
1 detached	+.0044	+.0042	+.0043
2 in slice	−.0019	−.0013	−.0016
3 in slice	−.0015	−.0010	−.00125
4 detached	+.0101	−.0107	−.0003

SECOND TO THIRD PHASE.

2 detached	+.0011	+.0015	+.0013
3 detached	−.0008	+.0005	−.00015

FIRST TO THIRD PHASE.

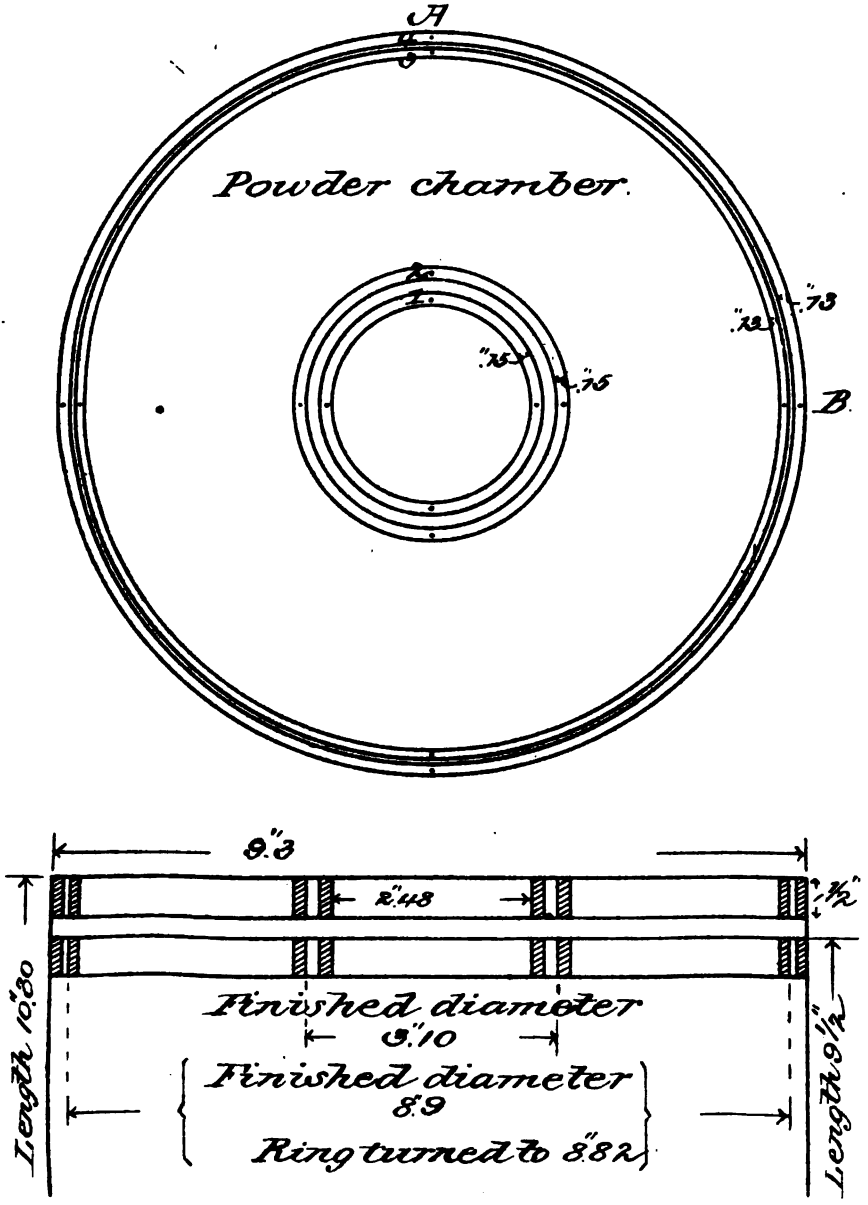
2 detached	−.0008	+.0002	−.0003
3 detached	−.0023	−.0005	−.0014

INTERNAL STRAINS

IN

SURPLUS METAL FROM ENDS OF 3-INCH SINGLE FORGING GUN.

3 inch Single Forging Gun.
Surplus metal from breech end



Forgings shipped from the Bethlehem Iron Company about March 24, 1898, to Watervliet Arsenal. Samples forwarded to Watertown Arsenal from Watervliet Arsenal.

BREECH END.

Interior diameter, 2″.48. Exterior diameter, 9″.3.
Measurements taken while the 10″.30 section was intact.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6410	2.6415	2.64125
2	3.2485	3.2496	3.24905
3	8.6843	8.6804	8.68235
4	9.1435	9.1442	9.14385

Slice ½″ long cut off the 10″.30 section and diameters remeasured.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6376	2.6380	2.6378
2	3.2450	3.2463	3.24565
3	8.6818	8.6780	8.6799
4	9.1412	9.1416	9.1414

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	2.6412	2.6421	2.64165
2	3.2437	3.2454	3.24455
3	8.6815	8.6777	8.6796
4 detached	9.1868	9.1899	9.18835

RINGS ALL DETACHED.

2 detached	3.2477	3.2489	3.2483
3 detached	8.6781	8.6748	8.67645

BREECH END.

State of internal strains and stresses in the 10″.30 section and in the detached slice.

Section 10″.30 long intact.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.64125		.0004		4,500
2	3.24905	.00075		6,900	
2	8.68235	.0059		20,300	
4	9.14385	.00545		17,900	

Slice ½″ long cut off the 10″.30 section and diameters remeasured.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6378		.00385		43,800
2	3.24565		.00265		24,500
3	8.6799	.00345		11,900	
4	9.1414	.00805		10,000	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 3″.10. Exterior diameter, 8″.82.

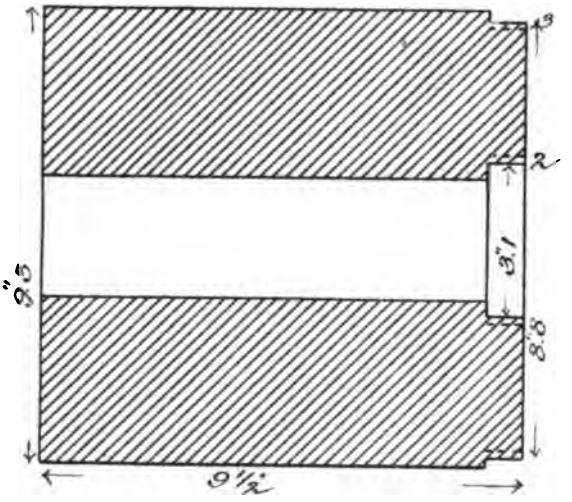
Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	2.64165				
2	3.24455		.00875		34,600
3	8.6796	.00815		10,900	
4 detached	9.13835				

RINGS ALL DETACHED.

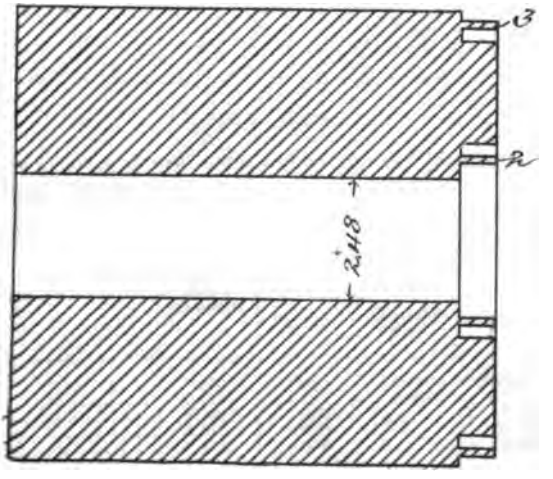
2 detached	3.2483				
3 detached	8.67645				

Breech end.

Rings 1 and 4 detached,
rings 2 and 3 on end of piece.



Cuts detaching sides of rings 2 and 3,
ends of rings still attached to piece.



BREECH END.

Second series of experiments on end of piece, now 9½″ long. Measurements on end of reduced section.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6210	2.6160	2.6185
2	3.2351	3.2306	3.23295
3	3.6750	3.6680	3.6715
4	9.1739	9.1709	9.1724

Rings 1 and 4 detached; rings 2 and 3 remain on the end of piece.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	2.6215	2.6160	2.61875
2	3.2348	3.2304	3.2326
3	3.6755	3.6683	3.6719
4 detached	9.1713	9.1635	9.1674

Cuts detaching sides of rings 2 and 3, ends of rings still attached to piece.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2 sides detached	3.2355	3.2307	3.2331
3 sides detached	3.6723	3.6659	3.6691

ALL RINGS WHOLLY DETACHED.

2 detached	3.2347	3.2301	3.2324
3 detached	3.6692	3.6622	3.6657

BREECH END.

State of internal strains and stresses in the 9½″ section. Section 9½″ long intact.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6185	.....	.00025	.....	2,900
2	3.23295	.00055	.....	5,100	.....
3	3.6715	.0058	.....	20,100	.....
4	9.1724	.0050	.....	16,300	.....

Rings 1 and 4 detached; rings 2 and 3 remain on the end of piece.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	2.61875				
2 on end of piece	3.2326	.0002		1,800	
3 on end of piece	3.6719	.0062		21,400	
4 detached	9.1674				

Cuts detaching sides of rings 2 and 3; ends of rings still attached to piece.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2 sides detached	3.2331	.0007		6,500	
3 sides detached	3.6691	.0084		11,700	

ALL RINGS WHOLLY DETACHED.

2 detached	3.2324				
3 detached	3.6657				

Breech End.

A slice taken from remaining part of the piece.

This slice was heated to a full red and cooled slowly in dry sawdust covered with sand.

Rings 1 and 2 laid off and measured after the above annealing.

Annealed for the purpose of eliminating initial strains.

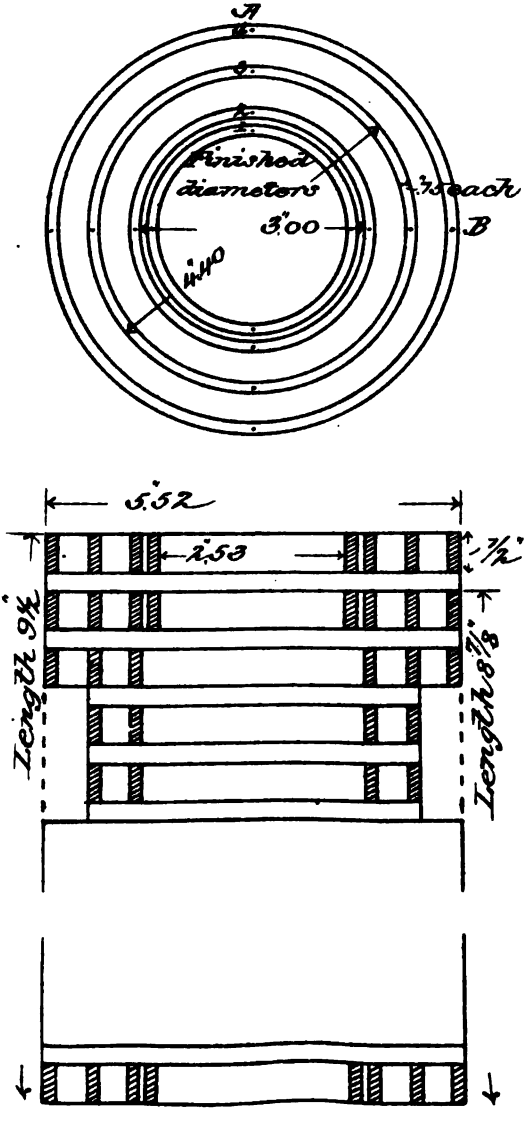
RINGS IN THE SLICE.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6230	2.6142	2.6186
2	3.2594	3.2525	3.25595

RINGS DETACHED.

1 detached	2.6229	2.6142	2.61855
2 detached	3.2596	3.2525	3.25605

3-inch Single Forging Gun.
Surplus metal from muzzle end.



MUZZLE END.

Measurements taken while the 9½″ section was intact.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6775	2.6777	2.6776
2	3.1381	3.1487	3.1434
3	4.2525	4.2505	4.2515
4	5.3537	5.3612	5.35745

Slice ½″ long cut off 9½″ section and diameters remeasured.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6758	2.6757	2.6755
2	3.1362	3.1467	3.14145
3	4.2509	4.2488	4.24985
4	5.3521	5.3592	5.35565

Rings 1 and 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	2.6779	2.6779	2.6779
2	3.1356	3.1465	3.14105
3	4.2511	4.2492	4.25015
4 detached	5.3584	5.3567	5.35505

RINGS ALL DETACHED.

2 detached	3.1369	3.1475	3.1422
3 detached	4.2500	4.2480	4.2490

MUZZLE END.

State of internal strains and stresses in the 9½″ section and in the detached slice.

Section 9½″ long intact.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6776		.0003		3,400
2	3.1434	.0012		11,500	
3	4.2515	.0025		17,600	
4	5.35745	.0024		18,400	

Slice ½″ long cut off the 9½″ section and diameters remeasured.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds*	*Pounds.*
1	2.6756		.0024		26,900
2	3.14145		.00075		7,200
3	4.24985	.00085		6,000	
4	5.35565	.0006		3,400	

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameter of slice, 3″. Exterior diameter, 4″.40.

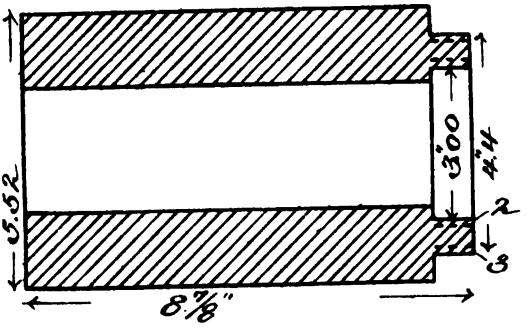
Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	2.6779				
2	3.14105		.00115		11,000
3	4.25015	.00115		8,100	
4 detached	5.35505				

RINGS ALL DETACHED.

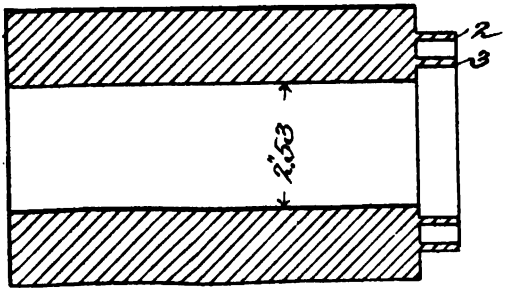
2 detached	3.1422				
3 detached	4.2490				

Muzzle end.

Rings 1 and 4 detached.
rings 2 and 3 on end of piece



Metal between rings 2 and 3 removed
ends of rings still attached to piece.



MUZZLE END.

Second series of observations on end of piece, now 8⅞″ long.

Measurements on end of reduced section.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6902	2.6974	2.6988
2	3.1457	3.1415	3.1436
3	4.2445	4.2476	4.24605
4	5.3616	5.3581	5.35985

Rings 1 and 4 detached; rings 2 and 3 remain on the end of piece.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	2.6908	2.6976	2.6942
2 on end of piece	3.1457	3.1418	3.14375
3 on end of piece	4.2452	4.2482	4.2467
4 detached	5.3589	5.3519	5.3554

Metal between rings 2 and 3 removed; rings still attached to end of piece.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2 sides detached	3.1452	3.1413	3.14325
3 sides detached	4.2429	4.2459	4.2444

ALL RINGS WHOLLY DETACHED.

2 detached	3.1441	3.1401	3.1421
3 detached	4.2417	4.2447	4.2432

MUZZLE END.

State of internal strains and stresses in the $8\frac{7}{8}$" section.
Section $8\frac{7}{8}$" long.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6988	.....	.0004	.....	4,400
2	3.1486	.0015	.....	14,800	.....
3	4.24605	.00285	.....	20,100	.....
4	5.35985	.00445	.....	24,900	.....

Rings 1 and 4 detached; rings 2 and 3 remain on the end of piece.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	2.6942	.....	.....	.....	.....
2 on end of piece	3.14375	.00165	.....	15,700	.....
3 on end of piece	4.2467	.0035	.....	24,700	.....
4 detached	5.3554	.....	.....	.....	.....

Metal between rings 2 and 3 removed; rings still attached to end of piece.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2 sides detached	3.14325	.00115	.....	11,000	.....
3 sides detached	4.2444	.0012	.....	8,400	.....

ALL RINGS WHOLLY DETACHED.

2 detached	3.1421	.....	.....	.....	.....
3 detached	4.2432	.....	.....	.....	.....

MUZZLE END.

Measurements taken on opposite end of the piece, the present length of which is 7″.75.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6995	2.7001	2.6998
2	3.1583	3.1600	3.15915
3	4.2350	4.2410	4.2380
4	5.3784	5.3722	5.3728

Slice ½″ long cut off end of piece and diameters remeasured.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6971	2.6977	2.6974
2	3.1558	3.1577	3.15675
3	4.2328	4.2387	4.28575
4	5.3716	5.3702	5.3709

Slice reduced to ¼″ in length and diameters again measured.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6974	2.6976	2.6975
2	3.1561	3.1576	3.15685
3	4.2333	4.2393	4.2363
4	5.3718	5.3701	5.37095

Rings 1 and 4 detached; rings 2 and 3 in the slice.
Interior diameters of slice, 3″.00. Exterior diameter, 4″.40.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	2.6991	2.7006	2.69985
2	3.1559	3.1575	3.1567
3	4.2330	4.2391	4.23605
4 detached[1]	5.3740	5.3706	5.3723

[1] Approximate diameters. Instability of shape attributed to conflicting internal strains.

RINGS ALL DETACHED.

2 detached	3.1567	3.1581	3.1574
3 detached	4.2325	4.2387	4.2356

MUZZLE END.

State of internal strains and stresses in opposite end of section 7″.75 long, and in detached slice.

Section 7″.75 long.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6998	.....	.00005	.....	500
2	3.15915	.00175	.....	16,600	.....
3	4.2380	.0024	.....	17,000	.....
4	5.3728	.0005	.....	2,800	.....

Slice ¼″ long cut off end of piece.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6974	.....	.00245	.....	27,200
2	3.15675	.....	.00065	.....	6,200
3	4.23575	.00015	.....	1,100	.....
4	5.3709	.....	.0014	.....	7,800

Slice reduced to ¼″ length.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches,	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6975	.....	.00235	.....	26,100
2	3.15685	.....	.00055	.....	5,200
3	4.2363	.0007	.....	4,900	.....
4	5.37095	.....	.00185	.....	7,500

Rings 1 and 4 detached, rings 2 and 3 in the slice.
Interior diameter of slice, 3″.00. Exterior diameter, 4″.40.

Rings.	Present. mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	2.69985	.....	.....	.....	.....
2	3.1567	.....	.0007	.....	6,600
3	4.23605	.00045	.....	3,200	.....
4 detached	5.3723	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	3.1574	.....	.....	.....	.....
3 detached	4.2356	.....	.....	.....	.....

MUZZLE END.

Measurements taken on first end of piece. Exterior cylindrical surface of piece not turned. Surface of bore, bored out to finished dimensions of the gun, 3″.00.

Present length of piece, 6¾″.

Measurements taken on first end of piece.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2	3.1471	3.1521	3.1496
3	4.2465	4.2485	4.2475
4	5.3582	5.3592	5.3587

Slice ½″ long cut off end of piece and diameters remeasured.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2	3.1458	3.1492	3.1475
3	4.2459	4.2471	4.24625
4	5.3571	5.3579	5.3575

Ring 4 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches*	*Inches.*
2	3.1466	3.1516	3.1491
3	4.2465	4.2481	4.2473
4 detached	5.3559	5.3559	5.3559

RINGS ALL DETACHED.

2 detached	3.1476	3.1527	3.15015
3 detached	4.2452	4.2468	4.2460

MUZZLE END.

State of internal strains and stresses in first end of section $6\frac{3}{4}$" long, with surface of bore turned to finished dimensions of gun, and in detached slice.

Section $6\frac{3}{4}$" long.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	3.1496	.....	.00055	.....	5,200
3	4.2475	.0015	.....	10,600	.....
4	5.3587	.0028	.....	15,700	.....

Slice $\frac{1}{2}$" long cut off end of piece, and diameters remeasured.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	3.1475	.....	.00265	.....	25,200
3	4.24625	.00025	.....	1,800	.....
4	5.3575	.0016	.....	9,000	.....

Ring 4 detached; rings 2 and 3 in the slice.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	3.1491	.....	.00105	.....	10,000
3	4.2473	.0013	.....	9,200	.....
4 detached	5.3559	.....	.....	.....	.....

RINGS ALL DETACHED.

2 detached	3.15015	.....	.....	.....	.....
3 detached	4.2460	.....	.....	.....	.....

MUZZLE END.

Piece brought to the finished dimensions of muzzle of gun.

Present length of piece 6″. Interior diameter, 3″. Exterior diameter 4″.40.

Measurements taken on end of piece 6″ long.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2	3.1523	3.1456	3.14895
3	4.2684	4.2576	4.2630

Slice ½″ long cut off end of piece, and diameters remeasured.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2	3.1515	3.1447	3.1481
3	4.2677	4.2568	4.26225

RINGS DETACHED.

2 detached	3.1524	3.1453	3.14885
3 detached	4.2663	4.2556	4.26095

MUZZLE END.

State of internal strains and stresses in end of 6″ section and in detached slice.

End of 6″ section.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	3.14895	.0001	.....	1,000	.....
3	4.2630	.00205	.....	14,400	.....

Slice $\frac{1}{2}$" long cut off end of piece and diameters remeasured.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	3.1481		.00075		7,100
3	4.26225	.0013		9,100	
RINGS DETACHED.					
2 detached	3.14885				
3 detached	4.26095				

Muzzle End.

Piece 5".3 long of finished diameters of gun at the muzzle, annealed by heating to a full red and cooling in dry sawdust covered with dry sand.

Measurements taken on end of annealed piece 5".3 long.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2	3.1488	3.1504	3.1496
3	4.2596	4.2614	4.2605

Slice $\frac{1}{2}$" long cut off end of piece, and diameters remeasured.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
2	3.1489	3.1504	3.14965
3	4.2596	4.2613	4.26045
RINGS DETACHED.			
2 detached	3.1490	3.1504	3.1497
3 detached	4.2596	4.2612	4.2604

Rings cut apart radially. No springing of ends.

MUZZLE END.

State of internal strains and stresses in end of annealed piece 5″.3 long, and in detached slice.

End of 5″.3 section.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	3.1496	.....	.0001	.....	1,000
3	4.2605	.0001	.....	700	.....

Slice ½″ long cut off end of piece, and diameters remeasured.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	3.14965	.....	.00005	.....	500
3	4.26045	.00005	.....	300	.....

RINGS DETACHED.

2 detached	3.1497	.....	.....	.....	.....
3 detached	4.2604	.....	.....	.....	.....

INTERNAL STRAINS

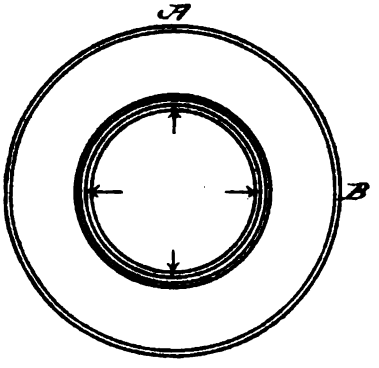
IN

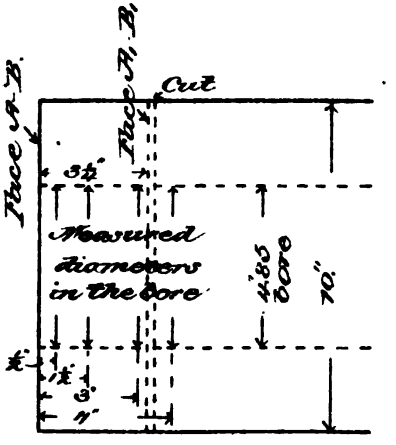
SURPLUS METAL FROM ENDS OF 5-INCH R. F. GUN TUBE.

5-inch R.F. Gun Tube.

Surplus metal at ends.

Breech end.





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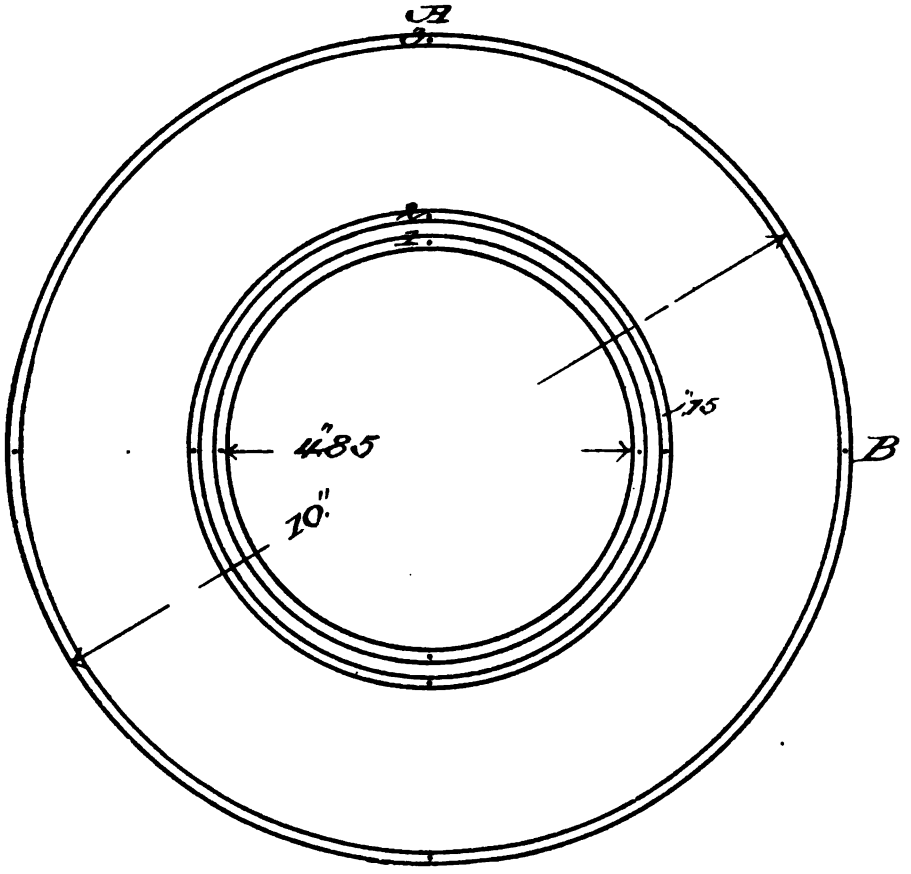
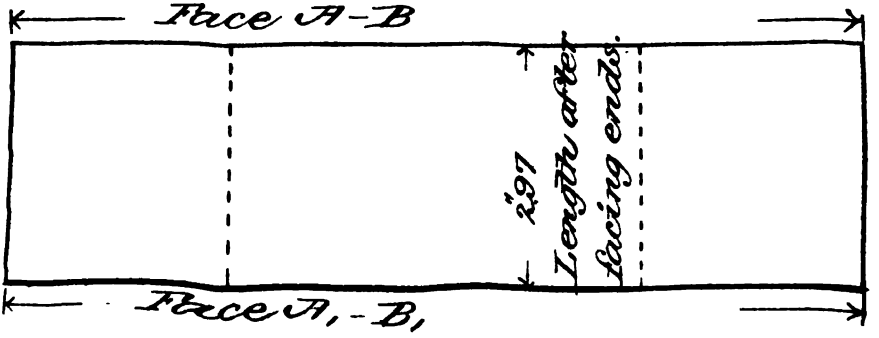
5-inch R.F. Gun Tube.
Breech section.





Breech Section. Face A–B.

Section intact.
Surface diameters.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0092	5.0065	5.00785
2	5.6464	5.6534	5.6499
3	9.8454	9.8462	9.8458

Slice $\frac{1}{2}$" long detached from face A–B.
Surface diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0076	5.0049	5.00625
2	5.6450	5.6521	5.64855
3	9.8446	9.8455	9.84505

Ring 1 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	5.0126	5.0127	5.01265
2	5.6433	5.6505	5.6469
3	9.8434	9.8442	9.8438

RINGS ALL DETACHED.

2 detached	5.6474	5.6540	5.6507
3 detached	9.8397	9.8445	9.8421

Breech Section. Face A–B.

State of internal strains and stresses during the successive changes in the state of the metal.
Section 2".97 long intact.

Rings.	Present mean diameters.	Strains.		Stresses.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.00785	.....	.0048	.....	28,700
2	5.6499	.....	.0008	.....	4,200
3	9.8458	.0087	.....	11,300	.....

Slice ½″ long detached from face A–B.

Rings.	Present mean diameters.	Strains.		Stresses.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.00625		.0064		38,300
2	5.64855		.00215		11,400
3	9.84505	.00295		9,000	

Ring 1 detached; rings 2 and 3 in the slice.

Rings.	Present mean diameters.	Strains.		Stresses.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	5.01265				
2	5.6469		.0088		20,200
3	9.8438	.0017		5,200	

RINGS ALL DETACHED.

2 detached	5.6507				
3 detached	9.8421				

Breech Section. Face A_1–B_1.

Section intact.
Surface diameters.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0058	5.0070	5.00615
2	5.6455	5.6415	5.6435
3	9.8580	9.8584	9.8567

Slice ½″ long detached from face A–B.
Section remaining 2″.06 long.
Surface diameters measured on face A_1–B_1.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0048	5.0064	5.0056
2	5.6450	5.6409	5.64295
3	9.8578	9.8532	9.8555

Slice ½″ long detached from face A_1–B_1.
Surface diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0088	5.0055	5.00465
2	5.6443	5.6401	5.6422
3	9.8567	9.8523	9.8545

Ring 1 detached; rings 2 and 3 in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1 detached	5.0081	5.0115	5.0098
2	5.6430	5.6389	5.64095
3	9.8560	9.8517	9.8538

RINGS ALL DETACHED.

2 detached	5.6470	5.6437	5.64535
3 detached	9.8505	9.8486	9.84955

Breech Section. Face A_1–B_1.

State of internal strains and stresses during the successive changes in the state of the metal.
Section 2″.97 long intact.

Rings.	Present mean diameters.	Strains.		Stresses.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.00615	.....	.00365	.....	21,900
2	5.6435	.....	.00185	.....	9,800
3	9.8557	.00615	.....	18,700	.....

Slice ½″ long detached from face A–B.
Section remaining 2″.06 long.

Rings.	Present mean diameters.	Strains.		Stresses.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.0056	.....	.0042	.....	25,200
2	5.64295	.....	.0024	.....	12,800
3	9.8555	.00595	.....	18,100	.....

Slice ½″ long detached from face A_1–B_1.

DETACHED SLICE.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.00465	.....	.00515	.....	30,900
2	5.6422	.....	.00315	.....	16,700
3	9.8545	.00496	.....	15,100	.....

Ring 1 detached; rings 2 and 3 in the slice.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	5.0098	.....	.....	.....	.....
2	5.64095	.....	.0044	.....	23,400
3	9.85385	.0043	.....	13,100	.....

RINGS ALL DETACHED.

2 detached	5.64585	.....	.....	.....	.....
3 detached	9.84955	.....	.....	.....	.....

MUZZLE SECTION. FACE A–B.

Section intact.
Surface diameters.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9993	5.0051	5.0022
2	7.9157	7.9170	7.91635

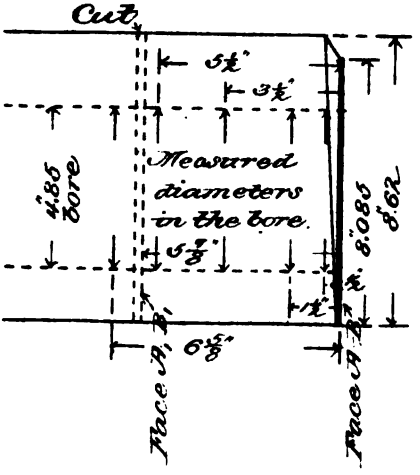
Eccentric metal turned off. Exterior diameter now 8″.075.

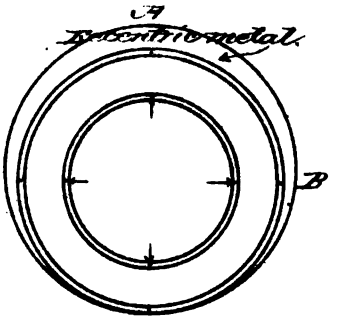
Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0000	5.0049	5.00245
2	7.9170	7.9168	7.9169

5-inch R.F. Gun Tube.

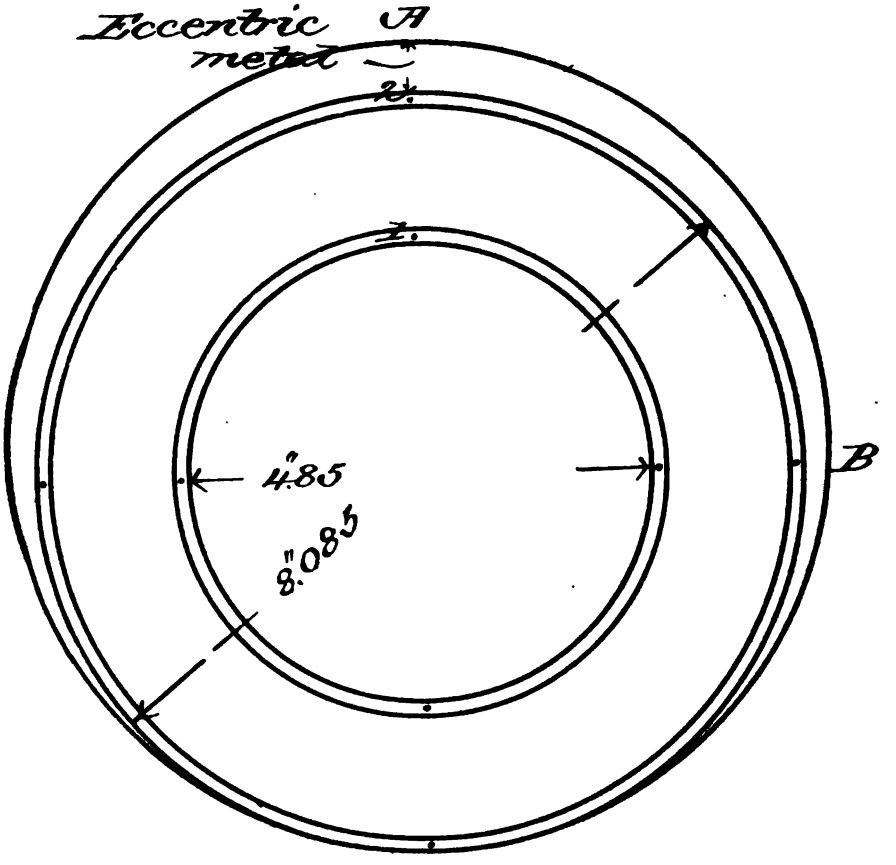
Surplus metal at ends.

Muzzle end





5-inch R. F. Gun Tube.
Muzzle section.



Face A-B.

Slice ½″ long detached from face A–B.
Surface diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	4.9965	5.0019	4.9992
2	7.9137	7.9144	7.91405
RINGS DETACHED.			
1 detached	5.0059	5.0005	5.0032
2 detached	7.9102	7.9130	7.9116

Muzzle Section. Face A–B.

State of internal strains and stresses during the successive changes in the state of the metal.
Section 5″.75 long intact.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.0022	.....	.0010	.....	5,900
2	7.91635	.00475	.....	18,000	.....

Eccentric metal turned off. Exterior diameter now 8″.075.
Section 5.″75 long.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.00245	.....	.00075	.....	4,500
2	7.9169	.0053	.....	20,800	.....

Slice ½″ long, detached from face A–B.
Rings in slice.

RING 1.

Present diameters.		Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
A	4.9965		.0094		56,400
B	5.0019	.0014		8,400	
Mean					24,000

RING 2.

A	7.9137	.0085		13,800	
B	7.9144	.0014		5,800	
Mean				9,800	

Muzzle Section. Face A_1–B_1.

Section intact.
Surface diameters.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0023	4.9945	4.9984
2	7.9158	7.9232	7.9195

Eccentric metal turned off. Exterior diameter now 8″.075.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0035	4.9944	4.99895
2	7.9170	7.9234	7.9202

Slice ½″ long detached from face A–B, leaving section 4″.6 long.
Surface diameters measured on face A_1–B_1.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0032	4.9943	4.99875
2	7.9165	7.9227	7.9196

Slice ½″ long detached from face A_1–B_1.
Surface diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.0006	4.9912	4.9959
2	7.9145	7.9201	7.9173

RINGS DETACHED.

1 detached	5.0081	4.9920	5.00005
2 detached	7.9123	7.9139	7.9131

Muzzle Section. Face A_1–B_1.

State of internal strains and stresses during the successive changes in the state of the metal.
Section 5″.75 long intact.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.9984		.00165		9,900
2	7.9195	.0064		24,200	

Eccentric metal turned off. Exterior diameter now 8″.075.
Section 5″.75 long.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.99896		.0011		6,600
2	7.9202	.0071		26,900	

Slice ½″ long detached from face A–B, leaving section 4″.6 long.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	4.99875		.0013		7,800
2	7.9196	.0065		24,600	

Slice ½" long detached from face A_1–B_1.
Rings in slice.

RING 1.

Present diameters.		Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
A	5.0006	.....	.0075	.....	45,000
B	4.9912	.....	.0008	.....	4,800
Mean	.....	.....	.....	.....	24,900

RING 2.

A	7.9145	.0022	.....	8,300	.....
B	7.9201	.0062	.....	23,500	.....
Mean	.....	.....	.....	15,900	.....

STRAINS RELEASED DURING THE SUCCESSIVE CHANGES IN THE STATE OF THE METAL.

BREECH END.

Surface diameters. Face A–B.

	Rings.	Diameters.		
		A.	B.	Mean
		Inch.	*Inch.*	*Inch.*
Section 3¼" long removed and faced off to 2".97	1, 2, 3	0.	0.	0.
¼" slice detached from face A-B	1	−.0016	−.0016	−.0016
	2	−.0014	−.0013	−.00135
	3	−.0008	−.0007	−.00075
Ring 1 detached	1	+.0050	+.0078	+.0064
Rings 2 and 3 in the slice	2	−.0017	−.0016	−.00165
	3	−.0012	−.0013	−.00125
Ring 2 detached	2	+.0041	+.0035	+.0038
Ring 3 detached	3	−.0037	+.0008	−.0017

STRAINS RELEASED DURING THE SUCCESSIVE CHANGES IN THE STATE OF THE METAL.

BREECH END.

Surface diameters. Face A_1–B_1.

	Rings.	Diameters. A.	B.	Mean.
		Inch.	*Inch.*	*Inch.*
Section 3¼″ long removed and faced off to 2″.97	1, 2, 3	0.	0.	0.
¼″ slice detached from face A–B, section remaining 2″.06 long	1	−.0005	−.0006	−.00055
	2	−.0005	−.0006	−.00055
	3	−.0002	−.0002	−.0002
¼″ slice detached from face A_1–B_1	1	−.0010	−.0009	−.00095
	2	−.0007	−.0008	−.00075
	3	−.0011	−.0009	−.0010
Ring 1 detached	1	+.0043	+.0060	+.00515
Rings 2 and 3 in the slice	2	−.0013	−.0012	−.00125
	3	−.0007	−.0006	−.00065
Ring 2 detached	2	+.0040	+.0048	+.0044
Ring 3 detached	3	−.0055	−.0031	−.0043

STRAINS RELEASED DURING THE SUCCESSIVE CHANGES IN THE STATE OF THE METAL.

MUZZLE END.

Surface diameters. Face A–B.

	Rings.	Diameters. A.	B.	Mean.
		Inch.	*Inch.*	*Inch.*
Section 5¼″ long removed and faced off to 5″.75	1, 2	0.	0.	0.
Eccentric metal turned off	1	+.0007	−.0002	+.00025
Exterior diameter now 8″.075	2	+.0013	−.0002	+.00055
¼″ slice detached from face A–B	1	−.0035	−.0030	−.00325
	2	−.0033	−.0024	−.00285
Ring 1 detached	1	+.0094	−.0014	+.0040
Ring 2 detached	2	−.0035	−.0014	−.00245

Strains Released During the Successive Changes in the State of the Metal.

MUZZLE END.

Surface diameters. Face A_1–B_1.

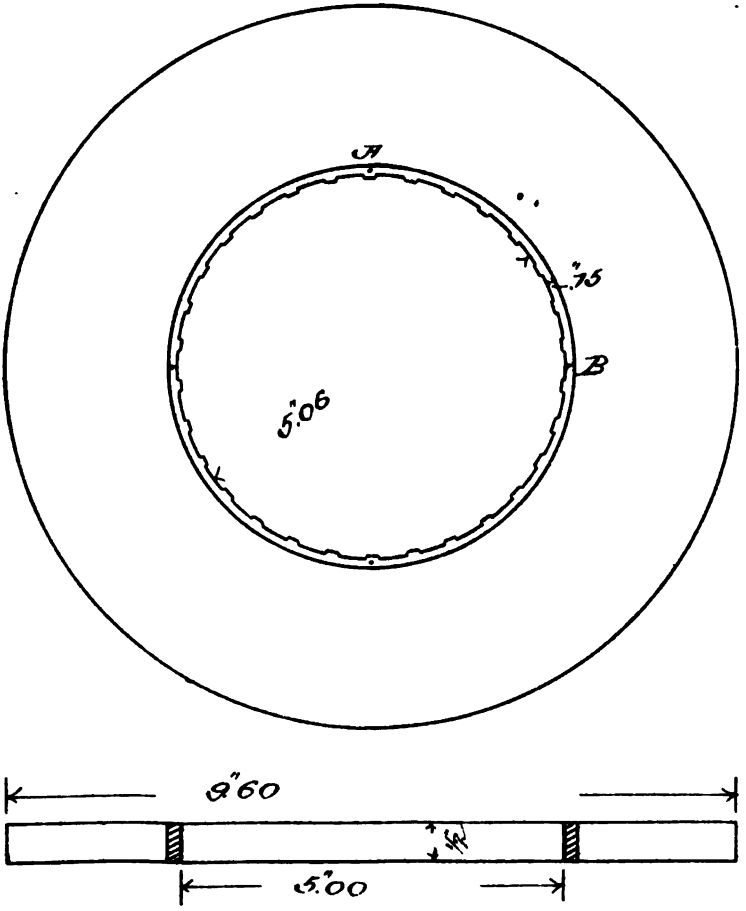
	Rings.	Diameters.		
		A.	B.	Mean.
		Inch.	*Inch.*	*Inch.*
Section 5½″ long removed and faced off to 5″.75	1	0.	0.	0.
	2			
Eccentric metal turned off. Exterior diameter now 8″.075	1	+.0012	—.0001	+.00055
	2	+.0012	+.0002	+.0007
¼″ slice detached from face A–B, section remaining 4″.6 long	1	—.0008	—.0001	—.0002
	2	—.0005	—.0007	—.0006
¼″ slice detached from face A_1–B_1	1	—.0026	—.0031	—.00285
	2	—.0020	—.0026	—.0023
Ring 1 detached	1	+.0075	+.0008	+.00415
Ring 2 detached	2	—.0022	—.0062	—.0042

INTERNAL STRAINS

IN THE

TUBE OF A 5-INCH BURST GUN.

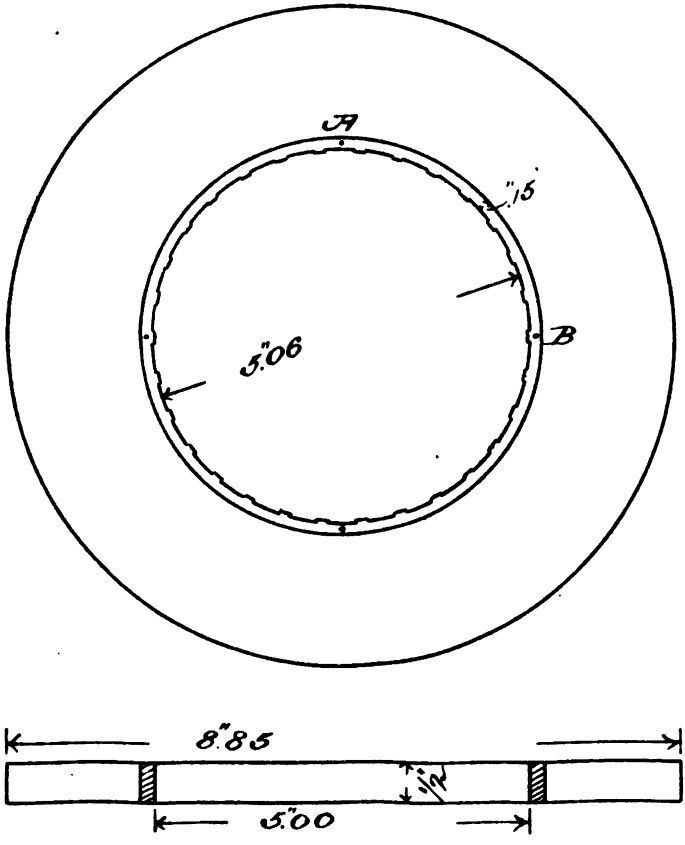
5-inch R.F. Gun No. 1.
Burst gun.
Slice cut from tube, 8ft. from muzzle.



5-inch R. F. Gun No. 1.

Burst gun.

Slice cut from tube, 5ft. from muzzle.



SLICE 8 FEET FROM MUZZLE.

SLICE INTACT.

Ring.	Diameters.		
	A.	B.	Mean.
1	*Inches.* 5.2131	*Inches.* 5.2155	*Inches.* 5.2143

RING DETACHED.

1 detached	5.2133	5.2119	5.2126

Ring cut apart radially, whereupon the ends closed in a distance of ″.44 measured on a chord of 1″.00.

SLICE 5 FEET FROM MUZZLE.

Exterior diameter of slice, 8″.85.

SLICE INTACT.

Ring.	Diameters.		
	A.	B.	Mean.
1	*Inches.* 5.2101	*Inches.* 5.2090	*Inches.* 5.20955

RING DETACHED.

1 detached	5.2078	5.2120	5.2099

Ring cut apart radially, whereupon the ends closed in ″.34 measured on a chord of 1″.00.

The ring was straightened and then curved in the reverse direction, bending the ring until it assumed a curvature of 6″ radius. Along the junction of one land and a groove on the slack side of the land a fine longitudinal crack developed; otherwise no cracks were visible.

Slice 3 Feet from Muzzle

Exterior diameter of slice, 7″.76.

SLICE INTACT.

Ring.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.2123	5.2048	5.20855

RING DETACHED.

1	5.2119	5.2041	5.2080

Ring cut apart radially (one cut with a hack saw), whereupon the ends sprung together firmly.

Slice 4 Inches from Muzzle.

Exterior diameter of slice, 7″.22.

SLICE INTACT.

Ring.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.2154	5.2114	5.2134

RING DETACHED.

1	5.2157	5.2101	5.2129

Ring cut apart radially, whereupon the ends sprung together ″.23, measured on a chord of 1″.00.

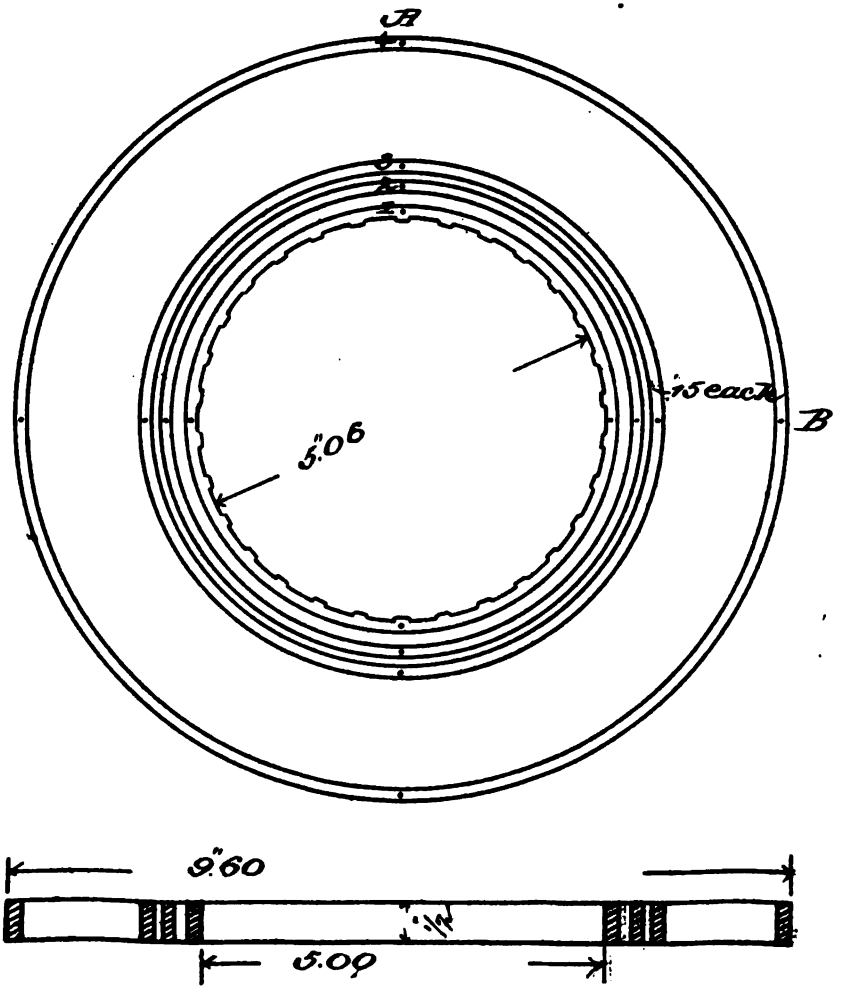
Stresses released by detaching rings 1 from the several slices.

Distance of slice from muzzle.	Mean diameters, rings 1.		Difference.	Stresses released.	
	In slice.	Detached.		Tension.	Compression.
	Inches.	*Inches.*	*Inch.*	*Pounds.*	*Pounds.*
8 feet	5.2143	5.2126	−.0017	9,800	.....
5 feet	5.20955	5.2099	+.00035	.....	2,000
3 feet	5.20855	5.2080	−.00055	3,200	.....
4 inches	5.2134	5.2129	−.0005	2,900	.....

5-inch R. F. Gun No. 1.

Burst gun.

Slice cut from tube, 11 ft. from muzzle.



SLICE 11 FEET FROM MUZZLE.

Original diameter of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	5.2252	5.2308	5.22775
2	5.7852	5.7808	5.7830
3	6.3330	6.3318	6.3324
4	9.4330	9.4396	9.4363

RINGS ALL DETACHED.

1 detached	5.2292	5.2261	5.22765
2 detached	5.7856	5.7813	5.78345
3 detached	6.3328	6.3320	6.3324
4 detached	9.4339	9.4398	9.43685

SLICE 11 FEET FROM MUZZLE.

SLICE INTACT.

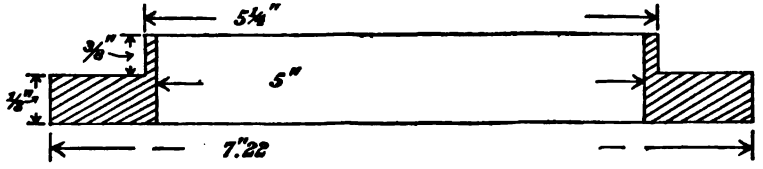
State of internal strains and stresses.

Rings.	Present mean diameters.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	5.22775	.0001		600	
2	5.7830		.00045		2,300
3	6.3324	0.	0.	0	0
4	9.4363		.00055		1,700

Ring 1 cut apart radially, whereupon the ends closed in a distance of about ".23 circumferentially.

The lands of the ring showed very generally, on their top surfaces, short circumferential cracks.

Slice taken 4" from muzzle end of tube.



In cutting off the ½" slice from the tube, when the metal below the cutting off tool was about 5½" diameter the tool was changed and a narrower one employed to detach the slice, leaving the slice with a thin ring of metal attached at one end, as shown in the above sketch.

The slice was then faced off on each end, and the outside of the ring of attached metal turned down to 5".227 diameter.

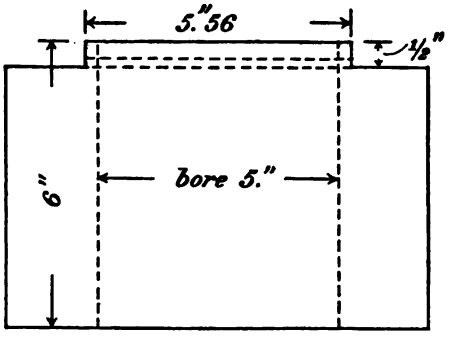
Measurements of the bore at the outer end of the attached ring were then begun, and continued as the metal in the attached ring was turned down to smaller diameters.

Exterior diameter of ring.	Micrometer reading	Thickness of metal in ring over lands.	Strains released.	
			Total contraction.	Successive contraction.
Inches.	*Inch.*	*Inch.*	*Inch.*	*Inch.*
5.227	.1922	.1135	0.	0.
5.187	.1917	.0935	.0005	.0005
5.147	.1912	.0735	.0010	.0005
5.107	.1904	.0535	.0018	.0008

The tensile stress corresponding to the total strain, ".0018 released, is (.0018 × 30,000,000) ÷ 5.00 = 10,800 pounds per square inch.

The thin ring was now detached and cut apart radially, whereupon the ends sprung together, overlapping each other 1".30, thus releasing residual strains, and indicating the prior existence of internal strains of rapidly varying intensity in the walls of the thin ring.

Section 6" long taken from the tube, 5 feet from the muzzle.



At one end of the 6" section the metal was turned down, a length of ½", until the exterior diameter was reduced to 5."56. At this state two diameters were established at the bore ".10 from the outside end of the ring which had been thus formed by the turning down of the metal.

On these two diameters, taken at right angles to each other, measurements were taken as the ring was successively reduced in thickness, with the following results:

Exterior diameter of ring.	Thickness of metal in ring.	Micrometer readings on diameters.		Successive change in diameters.	
		A.	B.	A.	B.
Inches.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
5.56	.25	.1999	.2005	0.	0.
5.46	.20	.1997	.2008	−.0002	−.0002
5.36	.15	.1991	.1997	−.0006	−.0006
5.26	.10	.1982	.1988	−.0009	−.0009
Total contraction of ring at the bore.....				.0017	.0017

The ring, as above shown, had been contracting on the measured diameters as the outside metal was turned off, leaving its inner surface, the original surface of the bore, undisturbed.

The ring was now detached from the end of the piece, after which the micrometer readings were as follows:

	A.	B.
	Inch.	*Inch.*
Diameters	.1914	.2098
Successive change	−.0068	+.0110

The detached ring became elliptic.

The ring was cut apart radially, whereupon the ends sprung together a distance of ".62½, measured on a chord of 1".00

Section 6 Inches Long cut from the Tube, 8 Feet from the Muzzle.

Section turned down in the same manner as the 6" section taken 5 feet from muzzle.

When the ring on the end of piece was turned down to 5".66 exterior diameter, measurements at the bore were begun, and continued as follows:

Exterior diameter of ring.	Thickness of metal over grooves.	Micrometer readings on diameters.		Successive change in diameters.	
		A.	B.	A.	B.
Inches.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
5.66	.30	.2038	.2008	.....	.....
5.56	.25	.2034	.2004	−.0004	−.0004
5.46	.20	.2027	.1999	−.0007	−.0005
5.36	.15	.2023	.1993	−.0004	−.0006
5.26	.10	.2012	.1979	−.0011	−.0014
Total contraction of ring at the bore				.0026	.0029

The ring was now cut off the end of the piece, after which the diameters measured as follows: A, ".2032; B, ".2012, thus showing an expansion of ".0020 and .0033. The ring was cut apart radially, whereupon the ends sprung together a distance of ".55, measured on a chord of 1".00.

SECTION 6 INCHES LONG TAKEN FROM THE TUBE 11 FEET FROM THE MUZZLE END.

Section turned down at one end in the same manner as the section 5 feet from muzzle.

When the ring on the end of the piece was turned down to 6".14 diameter, measurements at the bore began and were continued as follows:

Exterior diameter of ring.	Thickness of metal over grooves.	Micrometer readings on diameters.		Successive change in diameters.	
		A.	B.	A.	B.
Inches.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
6.14	.54	.1989	.2006	0.	0.
6.06	.50	.1988	.2004	.0001	.0002
5.96	.45	.1988	.2004	0.	0.
5.86	.40	.1987	.2002	.0001	.0002
5.76	.35	.1987	.2002	0.	0.
5.66	.30	.1985	.2001	.0002	.0001
5.56	.25	.1981	.1997	.0004	.0004
5.46	.20	.1973	.1993	.0008	.0004
5.36	.15	.1968	.1992	.0005	.0001
5 26	.10	.1963	.1987	.0005	.0005
Total contraction of ring at the bore.....				.0026	.0019

The ring was now cut off the end of the piece, after which the diameters measured as follows: A, ".2072; B, ".1925; thus showing an expansion on diameter A of ".0109, and a contraction on diameter B of ".0062.

The ring was cut apart radially, whereupon the ends sprung together a distance of ".36 measured on a chord of 1".00.

A ring 4" from the muzzle end, ½" long, and ".10 thick over the grooves was cut off and then cut apart radially, whereupon the ends sprung together a distance of ".22, measured on a chord of 1".00.

5-INCH R. F. GUN TUBES.

TENSION SPECIMENS FROM INITIAL TENSION SLICES.

TANGENTIAL SPECIMENS FROM 5-INCH TUBE 11272 B_2.

BREECH SLICE.

No. 6458.

Diameter, ".480.
Sectional area, .181 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
181	1,000	0.	0.	0.	0.	Initial load.
905	5,000	.000100	.000100	0.	.....	
1,810	10,000	.000800	.000200	.....	.....	
3,620	20,000	.000683	.000333	.....	.....	
5,430	30,000	.001000	.000367	.....	.....	
6,335	35,000	.001167	.000167	.....	.....	
7,240	40,000	.001333	.000166	0.	.....	
8,145	45,000	.001533	.000200	.....	.....	
8,688	48,000	.001667	.000134	.....	.....	
8,869	49,000	.001700	.000033	.....	.....	Elastic limit.
9,050	50,000	.003367	.001667	.....	.....	
9,231	51,000	.005400	.002033	.....	.....	
9,412	52,000	.007367	.001967	.....	.....	
9,593	53,000	.008300	.000933	.....	.....	
9,774	54,000	.009167	.000867	.....	.....	
10,136	56,000	.011000	.001833	.....	.....	
10,498	58,000	.013233	.002233	.....	.....	
10,860	60,000	.014900	.001667	.....	.....	
11,222	62,000	.017000	.002100	.....	.....	
11,584	64,000	.019700	.002700	.....	.....	
11,946	66,000	.021667	.001967	.....	.....	
12,308	68,000	.024867	.003200	.....	.....	
12,670	70,000	.027167	.002300	.....	.....	
13,032	72,000	.030233	.003066	.....	.....	
13,394	74,000	.034033	.003800	.....	.....	
13,756	76,000	.038000	.003967	.....	.....	
14,118	78,000	.042367	.004367	.....	.....	
14,480	80,000	.048000	.005633	.....	.....	
14,842	82,000	.054833	.006833	.....	.....	
16,220	89,610	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,610
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.130
Reduction in area after rupture, per cent of original section		46.8
Position of rupture		".7 from neck
Character of broken surface		silky
Elongation of inch sections		".34", ".19, ".19

DUPLICATE OF No. 6458.

No. 6459.

Diameter, ".480.
Sectional area, .181 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
181	1,000	0.	0.	0.	0.	Initial load.
905	5,000	.000100	.000100	0.	.....	
1,810	10,000	.000800	.000200	.....	.....	
3,620	20,000	.000633	.000333	.....	.....	
5,430	30,000	.000967	.000334	.....	.....	
6,335	35,000	.001133	.000166	.....	.....	
7,240	40,000	.001300	.000167	.....	.....	
8,145	45.000	.001500	.000200	.....	.....	
9,050	50,000	.001700	.000200	.....	.....	Elastic limit.
9,231	51,000	.003000	.001300	.....	.....	
9,412	52,000	.004333	.001333	.....	.....	
9,593	53,000	.006667	.002334	.....	.....	
9,774	54,000	.007400	.000733	.....	.....	
10,136	56,000	.009633	.002233	.....	.....	
10,498	58,000	.010900	.001267	.....	.....	
10,860	60,000	.012833	.001933	.....	.....	
11,222	62,000	.014633	.001800	.....	.....	
11,584	64,000	.017000	.002367	.....	.....	
11,946	66,000	.019333	.002333	.....	.....	
12,308	68,000	.021000	.001667	.....	.....	
12,670	70,000	.024000	.003000	.....	.....	
13,032	72,000	.026000	.002000	.....	.....	
13,394	74,000	.029667	.003667	.....	.....	
13,756	76,000	.031667	.002000	.....	.....	
14,118	78,000	.036333	.004666	.....	.....	
14,480	80,000	.040333	.004000	.....	.....	
14,842	82,000	.045000	.004667	.....	.....	
15,204	84,000	.051000	.006000	.....	.....	
16,640	91,930	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,930
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.120
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		".75 from neck
Character of broken surface		silky, oblique, trace of granulation
Elongation of inch sections		" 84* " 15, ".12

TANGENTIAL SPECIMENS FROM ANNEALED 5-INCH TUBE, 11272 B_2.

BREECH SLICE.

No. 6460.

Diameter, ".480.
Sectional area, .181 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
181	1,000	0.	0.	0.	0.	Initial load.
905	5,000	.000100	.000100	0.	.....	
1,810	10,000	.000800	.000200	.....	.....	
3,620	20,000	.000633	.000833	.....	.....	
5,430	30,000	.000967	.000834	.....	.....	
6,335	35,000	.001133	.000166	.....	.....	
7,240	40,000	.001300	.000167	0.	.....	
8,145	45,000	.001500	.000200	.....	.....	
8,688	48,000	.001667	.000167	.....	.....	Elastic limit.
8,869	49,000	.001733	.000066	.....	.....	
		.002333	.000600	.....	.....	
9,050	50,000	.005000	.002667	.....	.....	
9,231	51,000	.005667	.000667	.....	.....	
9,412	52,000	.006333	.000666	.....	.....	
9,598	53,000	.007700	.001367	.....	.....	
9,774	54,000	.008333	.000633	.....	.....	
9,955	55,000	.009667	.001334	.....	.....	
10,136	56,000	.010033	.000366	.....	.....	
10,317	57,000	.011000	.000967	.....	.....	
10,498	58,000	.011833	.000833	.....	.....	
10,679	59,000	.013333	.001500	.....	.....	
10,860	60,000	.013733	.000400	.....	.....	
11,222	62,000	.015700	.001967	.....	.....	
11,584	64,000	.017400	.001700	.....	.....	
11,946	66,000	.019700	.002300	.....	.....	
12,308	68,000	.022500	.002800	.....	.....	
12,670	70,000	.024267	.001767	.....	.....	
13,032	72,000	.027500	.003233	.....	.....	
13,394	74,000	.030000	.002500	.....	.....	
13,756	76,000	.033000	.003000	.....	.....	
14,118	78,000	.037333	.004333	.....	.....	
14,480	80,000	.042500	.005167	.....	.....	
14,842	82,000	.046167	.003667	.....	.....	
15,204	84,000	.053333	.007166	.....	.....	
16,690	92,210	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,210
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.110
Reduction in area after rupture, per cent of original section		40.6
Position of rupture		".8 from neck
Character of broken surface		silky 60 per cent, fine granular 40 per cent
Elongation of inch sections		".13, ".14, ".33*

DUPLICATE OF No. 6460.

No. 6461.

Diameter, ".480.
Sectional area, .181 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
181	1,000	0.	0.	0.	0.	Initial load.
905	5,000	.000100	.000100	0.	.....	
1,810	10,000	.000800	.000200	.....	.....	
3,620	20,000	.000633	.000833	.....	.....	
5,430	30,000	.000967	.000334	.....	.....	
6,335	35,000	.001133	.000166	.....	.....	
7,240	40,000	.001300	.000167	0.	.....	
8,145	45,000	.001467	.000167	.....	.....	
8,326	46,000	.001500	.000033	.....	.....	
8,507	47,000	.001567	.000067	.....	.....	Elastic limit.
8,688	48,000	.005400	.003833	.....	.....	
8,869	49,000	.006333	.000933	.....	.....	
9,050	50,000	.006667	.000334	.....	.....	
9,231	51,000	.007667	.001000	.....	.....	
9,412	52,000	.008633	.000966	.....	.....	
9,593	53,000	.009567	.000934	.....	.....	
9,774	54,000	.010600	.001033	.....	.....	
10,136	56,000	.012100	.001500	.....	.....	
10,498	58,000	.014600	.002500	.....	.....	
10,860	60,000	.015967	.001367	.....	.....	
11,222	62,000	.018633	.002666	.....	.....	
11,584	64,000	.020833	.002200	.....	.....	
11,946	66,000	.022833	.002000	.....	.....	
12,308	68,000	.026333	.003500	.....	.....	
12,670	70,000	.029167	.002834	.....	.....	
13,032	72,000	.031667	.002500	.....	.....	
13,394	74,000	.036000	.004333	.....	.....	
13,756	76,000	.039933	.003933	.....	.....	
14,118	78,000	.044500	.004567	.....	.....	
14,480	80,000	.051167	.006667	.....	.....	
16,190	89,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,450
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2167
Elongation per inch under strain at elastic limit	do...	.001567
Reduction in diameter at point of rupture	do...	.120
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		".85 from neck
Character of broken surface		silky, in part interspersed with fine granulation
Elongation of inch sections		".34", ".17, ".14

SOFT STEEL CAPS FOR 5-INCH A. P. SHELL.

501

No. 6226.

Marks, $\frac{5\,A\,P}{C\,1}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000550	.000300	.....	.....	
5,000	25,000	.000750	.000200	.....	.....	
5,200	26,000	.000800	.000050	.....	.....	Elastic limit.
5,400	27,000	.009600	.008800	.....	.....	
5,600	28,000	.011000	.001400	.....	.....	
5,800	29,000	.012400	.001400	.....	.....	
6,000	30,000	.014000	.001600	.....	.....	
11,090	55,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	55,450
Elastic limit per square inch of original section	do...	26,000
Elongation per inch after rupture	inch..	.3250
Elongation per inch under strain at elastic limit	do...	.000800
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		54.6
Position of rupture		1" from neck
Character of broken surface		fine, silky
Elongation of inch sections		".23, ".42*

No. 6227.

Marks, $\frac{5\,A\,P}{C\,2}$
Diameter, ".500.
Sectional area, .196 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
196	1,000	0.	0.	0.	0.	Initial load.
980	5,000	.000100	.000100	0.	.....	
1,960	10,000	.000800	.000200	.....	.....	
3,920	20,000	.000600	.000800	.....	.....	
4,900	25,000	.000850	.000250	.....	.....	
5,096	26,000	.000950	.000100	.....	.....	Elastic limit.
5,292	27,000	.001500	.000550	.....	.....	
5,488	28,000	.010250	.008750	.....	.....	
5,684	29,000	.012000	.001750	.....	.....	
5,880	30,000	.013500	.001500	.....	.....	
6,076	31,000	.015500	.002000	.....	.....	
11,170	56,990	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,990
Elastic limit per square inch of original section	do...	26,000
Elongation per inch after rupture	inch..	.3600
Elongation per inch under strain at elastic limit	do...	.000950
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1".3 from neck
Character of broken surface		fine, silky

No. 6228.

Marks, $\frac{5\ A\ P}{C\ 3}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
5,000	25,000	.000950	.000300	.....	.....	
5,200	26,000	.001000	.000050	.....	.....	
5,400	27,000	.001050	.000050	.....	.....	Elastic limit.
5,600	28,000	.012000	.010950	.....	.....	
5,800	29,000	.013100	.001100	.....	.....	
6,000	30,000	.014900	.001800	.....	.....	
6,200	31,000	.016550	.001650	.....	.....	
6,400	32,000	.018600	.002050	.....	.....	
11,240	56,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,200
Elastic limit per square inch of original section	do...	27,000
Elongation per inch after rupture	inch..	.3900
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		59.8
Position of rupture		1″.7 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.44*, ″.34

CAST-STEEL SHELL BODIES.

SPECIMENS FROM 800-POUND AND 1,000-POUND B. L. MORTAR SHELLS.

800-Pound Shells.

No. 6035.

Marks, 5153.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,600	38,000	.001450	.000450	.....	.....	Elastic limit.
7,800	39,000	.001850	.000400	.....	.....	
8,000	40,000	.004500	.002650	.....	.....	
8,200	41,000	.007000	.002500	.....	.....	
8,400	42,000	.007950	.000950	.....	.....	
8,800	44,000	.009900	.001950	.....	.....	
9,200	46,000	.012500	.002600	.....	.....	
9,600	48,000	.015000	.002500	.....	.....	
10,000	50,000	.016500	.001500	.....	.....	
10,400	52,000	.018550	.002050	.....	.....	
10,800	54,000	.021000	.002450	.....	.....	
11,200	56,000	.024000	.003000	.....	.....	
11,600	58,000	.027000	.003000	.....	.....	
12,000	60,000	.030000	.003000	.....	.....	
12,800	64,000	.0400	.0100	.....	.....	
13,600	68,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	68,000
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.0600
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		″.1 from neck
Character of broken surface		granular 40 per cent, dull silky 60 per cent
Elongation of inch sections		″.05, ″.07*

No. 6036.

Marks, 5161.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,800	39,000	.001550	.000550	.....	.....	Elastic limit.
8,000	40,000	.001750	.000200	.....	.....	
8,200	41,000	.004750	.003000	.....	.....	
8,400	42,000	.007500	.002750	.....	.....	
8,600	43,000	.008900	.001400	.....	.....	
8,800	44,000	.009900	.001000	.....	.....	
9,200	46,000	.012000	.002100	.....	.....	
9,600	48,000	.014250	.002250	.....	.....	
10,000	50,000	.015900	.001650	.....	.....	
10,400	52,000	.018500	.002600	.....	.....	
10,800	54,000	.020100	.001600	.....	.....	
11,200	56,000	.022500	.002400	.....	.....	
11,600	58,000	.025500	.003000	.....	.....	
12,000	60,000	.028900	.003400	.....	.....	
12,800	64,000	.0350	.0061	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
15,200	76,000	.0700	.0150	.....	.....	
15,720	78,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,600
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.0950
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.6 from neck
Character of broken surface		granular 85 per cent, dull silky 15 per cent
Elongation of inch sections		″.11*, ″.08

No. 6037.

Marks, 5167.
Diameter, .505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,600	38,000	.001650	.000650	.....	.....	Elastic limit.
7,800	39,000	.001900	.000250	.....	.....	
8,000	40,000	.006750	.004850	.....	.....	
8,200	41,000	.008000	.001250	.....	.....	
8,400	42,000	.009400	.001400	.....	.....	
8,800	44,000	.011350	.001950	.....	.....	
9,200	46,000	.013300	.001950	.....	.....	
9,600	48,000	.015500	.002200	.....	.....	
10,000	50,000	.017650	.002150	.....	.....	
10,400	52,000	.020000	.002350	.....	.....	
10,800	54,000	.022750	.002750	.....	.....	
11,200	56,000	.025500	.002750	.....	.....	
11,600	58,000	.028500	.003000	.....	.....	
12,000	60,000	.031750	.003250	.....	.....	
12,800	64,000	.0400	.008250	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0650	.0150	.....	.....	
15,200	76,000	.0900	.0250	.....	.....	
15,610	78,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,050
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.1250
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		#.35 from neck
Character of broken surface		dull silky
Elongation of inch sections		#.11, #.14*

No. 6038.

Marks, 5173.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,200	36,000	.001450	.000450	.....	.....	
7,400	37,000	.001550	.000100	.....	.....	Elastic limit.
7,600	38,000	.004500	.002950	.....	.....	
7,800	39,000	.005400	.000900	.....	.....	
8,000	40,000	.006650	.001250	.....	.....	
8,200	41,000	.007500	.000850	.....	.....	
8,400	42,000	.008750	.001250	.....	.....	
8,800	44,000	.010750	.002000	.....	.....	
9,200	46,000	.012500	.001750	.....	.....	
9,600	48,000	.015000	.002500	.....	.....	
10,000	50,000	.017100	.002100	.....	.....	
10,400	52,000	.019500	.002400	.....	.....	
10,800	54,000	.021750	.002250	.....	.....	
11,200	56,000	.025250	.003500	.....	.....	
11,600	58,000	.027500	.002250	.....	.....	
12,000	60,000	.031000	.003500	.....	.....	
12,800	64,000	.0400	.0090	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0600	.0100	.....	.....	
15,200	76,000	.0800	.0200	.....	.....	
15,730	78,650	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,650
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.1150
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".4 from neck
Character of broken surface	granular 85 per cent, dull silky, 15 per cent	
Elongation of inch sections		".10, ".13*

No. 6039.

Marks, 5181.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001050	.000400	0.	.....	
7,800	39,000	.001500	.000450	.....	.....	Elastic limit.
8,000	40,000	.001750	.000250	.....	.....	
8,200	41,000	.004500	.002750	.....	.....	
8,400	42,000	.009000	.004500	.....	.....	
8,600	43,000	.010000	.001000	.....	.....	
8,800	44,000	.011650	.001650	.....	.....	
9,200	46,000	.014000	.002350	.....	.....	
9,600	48,000	.016000	.002000	.....	.....	
10,000	50,000	.018250	.002250	.....	.....	
10,400	52,000	.020500	.002250	.....	.....	
10,800	54,000	.023500	.003000	.....	.....	
11,200	56,000	.026400	.002900	.....	.....	
11,600	58,000	.029450	.003050	.....	.....	
12,000	60,000	.033000	.003550	.....	.....	
12,800	64,000	.0400	.0070	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0650	.0150	.....	.....	
15,200	76,000	.0950	.0300	.....	.....	
15,540	77,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pound...	77,700
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch.	.1300
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		18.2
Position of rupture		″.55 from neck
Character of broken surface		granular 80 per cent, dull silky 20 per cent
Elongation of inch sections		″.11, ″.15*

No. 6040.

Marks, 5188.
Diameter, ″.505.
Sectional area, .20 square inch
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000350	.000200	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
7,600	38,000	.001550	.000550	.....	.....	Elastic limit.
7,800	39,000	.001750	.000200	.....	.....	
8,000	40,000	.008500	.006750	.....	.....	
8,200	41,000	.009450	.000950	.....	.....	
8,400	42,000	.010500	.001050	.....	.....	
8,800	44,000	.012500	.002000	.....	.....	
9,200	46,000	.014750	.002250	.....	.....	
9,600	48,000	.017000	.002250	.....	.....	
10,000	50,000	.019500	.002500	.....	.....	
10,400	52,000	.021650	.002150	.....	.....	
10,800	54,000	.024750	.003100	.....	.....	
11,200	56,000	.027500	.002750	.....	.....	
11,600	58,000	.031600	.004100	.....	.....	
12,000	60,000	.034250	.002650	.....	.....	
12,800	64,000	.0450	.010750	.....	.....	
13,600	68,000	.0500	.0050	.....	.....	
14,400	72,000	.0700	.0200	.....	.....	
15,200	76,000	.1000	.0300	.....	.....	
15,630	78,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,150
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		″.25 from neck
Character of broken surface		granular 40 per cent, dull silky 60 per cent
Elongation of inch sections		″.14, ″.16[a]

No. 6041.

Marks, 5195.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000850	.000350	.....	.....	
6,000	30,000	.001050	.000400	0.	.....	
7,800	39,000	.001500	.000450	.....	.....	Elastic limit.
8,000	40,000	.001800	.000300	.....	.....	
8,200	41,000	.005000	.003200	.....	.....	
8,400	42,000	.007750	.002750	.....	.....	
8,600	43,000	.009000	.001250	.....	.....	
8,800	44,000	.009500	.000500	.....	.....	
9,200	46,000	.011650	.002150	.....	.....	
9,600	48,000	.013900	.002250	.....	.....	
10,000	50,000	.016000	.002100	.....	.....	
10,400	52,000	.017900	.001900	.....	.....	
10,850	54,000	.020150	.002250	.....	.....	
11,200	56,000	.022650	.002500	.....	.....	
11,600	58,000	.025550	.002900	.....	.....	
12,000	60,000	.028600	.003050	.....	.....	
12,800	64,000	.0350	.0064	.....	.....	
13,600	68,000	.0400	.0050	.....	.....	
14,400	72,000	.0550	.0150	.....	.....	
15 200	76,000	.0700	.0150	.....	.....	
15,860	79,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	79,300
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1200
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		at middle of stem
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".12*, ".12*

No. 6042.

Marks, 5202.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000650	.000250	.....	.....	
6,000	30,000	.001050	.000400	0.	.....	
6,800	34,000	.001450	.000400	.....	.....	Elastic limit.
7,000	35,000	.001650	.000200	.....	.....	
7,200	36,000	.001850	.000200	.....	.....	
7,400	37,000	.003150	.000700	.....	.....	
7,600	38,000	.004500	.001350	.....	.....	
7,800	39,000	.006750	.001250	.....	.....	
8,000	40,000	.006600	.000850	.....	.....	
8,400	42,000	.008500	.001900	.....	.....	
8,800	44,000	.010250	.001750	.....	.....	
9,200	46,000	.012000	.001750	.....	.....	
9,600	48,000	.013750	.001750	.....	.....	
10,000	50,000	.016500	.002750	.....	.....	
10,400	52,000	.018500	.002000	.....	.....	
10,800	54,000	.020550	.002050	.....	.....	
11,200	56,000	.023000	.002450	.....	.....	
11,600	58,000	.025750	.002750	.....	.....	
12,000	60,000	.029000	.003250	.....	.....	
12,800	64,000	.0350	.0060	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
15,200	76,000	.0750	.0200	.....	.....	
16,000	80,000	.1200	.0450	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,000
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	.1250
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		".45 from neck
Character of broken surface		granular
Elongation of inch sections		".14", ".11

No. 6043.

Marks, 5210.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,800	39,000	.001500	.000500	.....	.....	
8,000	40,000	.001600	.000100	.....	.....	Elastic limit.
8,200	41,000	.005000	.003400	.....	.....	
8,400	42,000	.008500	.003500	.....	.....	
8,600	43,000	.009500	.001000	.....	.....	
8,800	44,000	.010500	.001000	.....	.....	
9,200	46,000	.012900	.002400	.....	.....	
9,600	48,000	.014900	.002000	.....	.....	
10,000	50,000	.017100	.002200	.....	.....	
10,400	52,000	.019250	.002150	.....	.....	
10,800	54,000	.021600	.002350	.....	.....	
11,200	56,000	.024750	.003150	.....	.....	
11,600	58,000	.027700	.002950	.....	.....	
12,000	60,000	.031050	.003350	.....	.....	
12,800	64,000	.0400	.008950	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0600	.0100	.....	.....	
15,200	76,000	.0850	.0250	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of orginal section	pounds..	76,000
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".6 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".09*, ".08

No. 6044.

Marks, 5217.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.000950	.000350	0.	.....	
8,000	40,000	.001450	.000500	.....	.....	
8,000	41,000	.001450	0.	.....	.....	
8,400	42,000	.001500	.000050	.....	.....	
8,600	43,000	.001600	.000100	.....	.....	Elastic limit.
8,800	44,000	.010500	.008900	.....	.....	
9,000	45,000	.011250	.000750	.....	.....	
9,200	46,000	.012100	.000850	.....	.....	
9,600	48,000	.012950	.000850	.....	.....	
10,000	50,000	.015500	.002550	.....	.....	
10,400	52,000	.017400	.001900	.....	.....	
10,800	54,000	.020000	.002600	.....	.....	
11,200	56,000	.022150	.002150	.....	.....	
11,600	58,000	.025250	.003100	.....	.....	
12,000	60,000	.028250	.003000	.....	.....	
12,800	64,000	.0300	.001750	.....	.....	
13,600	68,000	.0400	.0100	.....	.....	
14,400	72,000	.0500	.0100	.....	.....	
15,200	76,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,000
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.0800
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.50 from neck
Character of broken surface		granular 40 per cent, dull silky 60 per cent
Elongation of inch sections		″.09*, ″.07

No. 6045.

Marks, 5224.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
8,000	40,000	.001350	.000350	.....	.....	Elastic limit.
8,200	41,000	.007750	.006400	.....	.....	
8,400	42,000	.008750	.001000	.....	.....	
8,600	43,000	.009500	.000750	.....	.....	
8,800	44,000	.010500	.001000	.....	.....	
9,200	46,000	.012750	.002250	.....	.....	
9,600	48,000	.015000	.002250	.....	.....	
10,000	50,000	.017150	.002150	.....	.....	
10,400	52,000	.019750	.002600	.....	.....	
10,800	54,000	.022000	.002250	.....	.....	
11,200	56,000	.025500	.003500	.....	.....	
11,600	58,000	.028500	.003000	.....	.....	
12,000	60,000	.032000	.003500	.....	.....	
12,800	64,000	.0400	.0080	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0650	.0150	.....	.....	
14,670	73,350	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,350
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.0800
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".85 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".07, ".09*

No. 6046.

Marks, 5233.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000650	.000800	.....	.....	
6,000	30,000	.001000	.000850	0.	.....	
8,000	40,000	.001500	.000500	.....	.....	
8,200	41,000	.001600	.000100	.....	.....	
8,400	42,000	.001700	.000100	.....	.....	Elastic limit.
8,600	43,000	.009250	.007550	.....	.....	
8,800	44,000	.010350	.001100	.....	.....	
9,200	46,000	.012000	.001650	.....	.....	
9,600	48,000	.014250	.002250	.....	.....	
10,000	50,000	.016500	.002250	.....	.....	
10,400	52,000	.019050	.002550	.....	.....	
10,800	54,000	.021500	.002450	.....	.....	
11,200	56,000	.024250	.002750	.....	.....	
11,600	58,000	.027000	.002750	.....	.....	
12,000	60,000	.030900	.003900	.....	.....	
12,800	64,000	.0350	.0041	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0600	.0150	.....	.....	
14,420	72,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,100
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.0750
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.7 from neck
Character of broken surface		granular 40 per cent, dull silky 60 per cent
Elongation of inch sections		″.05, ″.08

No. 6047.

Marks, 5238.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, ″2.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
8,000	40,000	.001450	.000450	.....	.....	
8,200	41,000	.001500	.000050	.....	.....	
8,400	42,000	.001550	.000050	.....	.....	Elastic limit.
8,600	43,000	.001700	.000150	.....	.....	
8,800	44,000	.001950	.000250	.....	.....	
9,000	45,000	.008000	.006050	.....	.....	
9,200	46,000	.009000	.001000	.....	.....	
9,600	48,000	.010750	.001750	.....	.....	
10,000	50,000	.012500	.001750	.....	.....	
10,400	52,000	.014400	.001900	.....	.....	
10,800	54,000	.016250	.001850	.....	.....	
11,200	56,000	.018750	.002500	.....	.....	
11,600	58,000	.020500	.001750	.....	.....	
12,000	60,000	.023250	.002750	.....	.....	
12,800	64,000	.0300	.006750	.....	.....	
13,600	68,000	.0400	.0100	.....	.....	
14,400	72,000	.0500	.0100	.....	.....	
15,200	76,000	.0600	.0100	.....	.....	
16,000	80,000	.0750	.0150	.....	.....	
16,410	82,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,050
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.95 from neck
Character of broken surface		granular 70 per cent, dull silky 30 per cent
Elongation of inch sections		″.07, ″.10*

No. 6048.

Marks, 5244.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000650	.000350	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
7,400	37,000	.001850	.000350	.....	.....	
7,600	38,000	.001400	.000050	.....	.....	Elastic limit.
7,800	39,000	.001650	.000250	.....	.....	
8,000	40,000	.007400	.005750	.....	.....	
8,200	41,000	.008350	.000950	.....	.....	
8,400	42,000	.009600	.001250	.....	.....	
8,800	44,000	.011500	.001900	.....	.....	
9,200	46,000	.014000	.002500	.....	.....	
9,600	48,000	.015600	.001600	.....	.....	
10,000	50,000	.018300	.002700	.....	.....	
10,400	52,000	.020950	.002650	.....	.....	
10,800	54,000	.023500	.002550	.....	.....	
11,200	56,000	.026250	.002750	.....	.....	
11,600	58,000	.030000	.003750	.....	.....	
12,000	60,000	.033750	.003750	.....	.....	
12,800	64,000	.0400	.006250	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0650	.0150	.....	.....	
15,200	76,000	.0950	.0300	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,000
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.1035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		".95 from neck
Character of broken surface		granular 60 per cent dull silky 40 per cent
Elongation of inch sections		".11*, ".10

No. 6050.

Marks, 5044.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	.....	.....	
2,000	10,000	.000350	.000200	.....	.....	
4,000	20,000	.000750	.000400	.....	.....	
6,000	30,000	.001000	.000250	.000050	.000050	
7,800	39,000	.001550	.000550	.....	.....	Elastic limit
8,000	40,000	.001850	.000300	.....	.....	
8,200	41,000	.007500	.005650	.....	.....	
8,400	42,000	.008900	.001400	.....	.....	
8,800	44,000	.010400	.001500	.....	.....	
9,200	46,000	.012650	.002250	.....	.....	
9,600	48,000	.014900	.002250	.....	.....	
10,000	50,000	.016750	.001850	.....	.....	
10,400	52,000	.019000	.002250	.....	.....	
10,800	54,000	.021500	.002500	.....	.....	
11,200	56,000	.024400	.002900	.....	.....	
11,600	58,000	.027000	.002600	.....	.....	
12,000	60,000	.030000	.003000	.....	.....	
12,800	64,000	.0350	.0050	.....	.....	
13,600	68,000	.0400	.0050	.....	.....	
14,400	72,000	.0550	.0150	.....	.....	
15,200	76,000	.0700	.0150	.....	.....	
15,410	77,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,050
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		".6 from neck
Character of broken surface		granular, dull spot at circumference
Elongation of inch sections		".09*, ".08

No. 6051.

Marks, 5254,
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001050	.000400	0.	.....	
7,800	39,000	.001600	.000550	.....	.....	Elastic limit.
8,000	40,000	.001900	.000300	.....	.....	
8,200	41,000	.002400	.000500	.....	.....	
8,400	42,000	.008500	.006100	.....	.....	
8,800	44,000	.009500	.001000	.....	.....	
9,200	46,000	.011500	.002000	.....	.....	
9,600	48,000	.013750	.002250	.....	.....	
10,000	50,000	.015500	.001750	.....	.....	
10,400	52,000	.018500	.003000	.....	.....	
10,800	54,000	.020900	.002400	.....	.....	
11,200	56,000	.023250	.002350	.....	.....	
11,600	58,000	.026000	.002750	.....	.....	
12,000	60,000	.028900	.002900	.....	.....	
12,800	64,000	.0350	.0061	.....	.....	
13,600	68,000	.0400	.0050	.....	.....	
14,400	72,000	.0550	.0150	.....	.....	
14,610	73,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,050
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.0700
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".2 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".08", ".06

No. 6052.

Marks, 5261.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000750	.000350	.....	.....	
6,000	30,000	.001050	.000300	0.	.....	
7,400	37,000	.001600	.000550	.....	.....	Elastic limit.
7,600	38,000	.001750	.000150	.....	.....	
7,800	39,000	.002050	.000300	.....	.....	
8,000	40,000	.002500	.000450	.....	.....	
8,200	41,000	.004950	.002450	.....	.....	
8,400	42,000	.007250	.002300	.....	.....	
8,800	44,000	.009400	.002150	.....	.....	
9,200	46,000	.010750	.001350	.....	.....	
9,600	48,000	.013050	.002300	.....	.....	
10,000	50,000	.014750	.001700	.....	.....	
10,400	52,000	.017500	.002750	.....	.....	
10,800	54,000	.020900	.003400	.....	.....	
11,200	56,000	.022400	.001500	.....	.....	
11,600	58,000	.025000	.002600	.....	.....	
12,000	60,000	.027900	.002900	.....	.....	
12,800	64,000	.0300	.0021	.....	.....	
13,600	68,000	.0400	.0100	.....	.....	
14,400	72,000	.0500	.0100	.....	.....	
15,200	76,000	.0700	.0200	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,000
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.0800
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		1" from neck
Character of broken surface		granular 80 per cent, dull silky 20 per cent
Elongation of inch sections		".06, ".10*

No. 6053.

Marks. 5268.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,400	37,000	.001600	.000600	.....	.....	Elastic limit.
7,600	38,000	.001950	.000350	.....	.....	
7,800	39,000	.002450	.000500	.....	.....	
8,000	40,000	.003000	.000550	.....	.....	
8,400	42,000	.004150	.001150	.....	.....	
8,800	44,000	.006250	.002100	.....	.....	
9,200	46,000	.007650	.001400	.....	.....	
9,600	48,000	.009500	.001850	.....	.....	
10,000	50,000	.011650	.002150	.....	.....	
10,400	52,000	.013500	.001850	.....	.....	
10,800	54,000	.015500	.002000	.....	.....	
11,200	56,000	.017500	.002000	.....	.....	
11,600	58,000	.020000	.002500	.....	.....	
12,000	60,000	.022400	.002400	.....	.....	
12,800	64,000	.0250	.0026	.....	.....	
13,600	68,000	.0300	.0050	.....	.....	
14,400	72,000	.0400	.0100	.....	.....	
15,200	76,000	.0500	.0100	.....	.....	
16,000	80,000	.0700	.0200	.....	.....	
16,200	81,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,000
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".3 from neck
Character of broken surface		granular
Elongation of inch sections		".07, ".10*

No. 6054.

Marks, 5273.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,400	37,000	.001450	.000450	.....	.....	Elastic limit.
7,600	38,000	.001700	.000250	.....	.....	
7,800	39,000	.002450	.000750	.....	.....	
8,000	40,000	.003950	.001500	.....	.....	
8,200	41,000	.004850	.000900	.....	.....	
8,400	42,000	.005950	.001100	.....	.....	
8,600	44,000	.008000	.002050	.....	.....	
8,800	46,000	.009900	.001900	.....	.....	
9,600	48,000	.011550	.001650	.....	.....	
10,000	50,000	.013750	.002200	.....	.....	
10,400	52,000	.015800	.002050	.....	.....	
10,800	54,000	.018100	.002300	.....	.....	
11,200	56,000	.020400	.002300	.....	.....	
11,600	58,000	.023000	.002600	.....	.....	
12,000	60,000	.026000	.003000	.....	.....	
12,800	64,000	.0300	.0040	.....	.....	
13,600	68,000	.0350	.0050	.....	.....	
14,400	72,000	.0500	.0150	.....	.....	
14,600	73,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,000
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.0700
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		at middle of stem
Character of broken surface		granular 70 per cent, dull silky 30 per cent
Elongation of inch sections		".07* ".07*

No. 6055.

Marks, 5280.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001050	.000450	.000050	.000050	
7,200	36,000	.001650	.000600	.....	.....	Elastic limit.
7,400	37,000	.002350	.000700	.....	.....	
7,600	38,000	.003500	.001150	.....	.....	
7,800	39,000	.004500	.001000	.....	.....	
8,000	40,000	.005900	.001400	.....	.....	
8,400	42,000	.008050	.002150	.....	.....	
8,800	44,000	.009900	.001850	.....	.....	
9,200	46,000	.012000	.002100	.....	.....	
9,600	48,000	.013900	.001900	.....	.....	
10,000	50,000	.016000	.002100	.....	.....	
10,400	52,000	.018600	.002600	.....	.....	
10,800	54,000	.020750	.002150	.....	.....	
11,200	56,000	.024250	.003500	.....	.....	
11,600	58,000	.027100	.002850	.....	.....	
12,000	60,000	.031000	.003900	.....	.....	
12,800	64,000	.0350	.0040	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0600	.0150	.....	.....	
14,610	73,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,050
Elastic limit per square inch of original section	do...	36,000
Elongation per inch after rupture	inch..	.0800
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.8 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		″.09⁸, ″.08

No. 6056.

Marks, 5288.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000400	.000250	.....	.....	
4,000	20,000	.000750	.000350	.....	.....	
6,000	30,000	.001050	.000300	0.	.....	
8,000	40,000	.001600	.000550	.....	.....	
8,200	41,000	.001650	.000050	.....	.....	
8,400	42,000	.001700	.000050	.....	.....	Elastic limit.
8,600	43,000	.001850	.000150	.....	.....	
8,800	44,000	.008750	.006900	.....	.....	
9,000	45,000	.009150	.000400	.....	.....	
9,200	46,000	.009750	.000600	.....	.....	
9,600	48,000	.011650	.001900	.....	.....	
10,000	50,000	.013950	.002300	.....	.....	
10,400	52,000	.015900	.001950	.....	.....	
10,800	54,000	.017650	.001750	.....	.....	
11,200	56,000	.019950	.002300	.....	.....	
11,600	58,000	.022500	.002550	.....	.....	
12,000	60,000	.024600	.002100	.....	.....	
12,800	64,000	.0300	.0054	.....	.....	
13,600	68,000	.0350	.0050	.....	.....	
14,400	72,000	.0450	.0100	.....	.....	
15,200	76,000	.0550	.0100	.....	.....	
16,000	80,000	.0750	.0200	.....	.....	
16,610	83,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,050
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		".50 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".09, ".13*

No. 6057.

Marks, 5295.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000700	.000350	.....	.....	
6,000	30,000	.001000	.000300	0.	.....	
7,800	39,000	.001550	.000550	.....	.....	Elastic limit.
8,000	40,000	.001850	.000300	.....	.....	
8,200	41,000	.007000	.005150	.....	.....	
8,400	42,000	.008000	.001000	.....	.....	
8,800	44,000	.010500	.002500	.....	.....	
9,200	46,000	.012400	.001900	.....	.....	
9,600	48,000	.014500	.002100	.....	.....	
10,000	50,000	.016600	.002100	.....	.....	
10,400	52,000	.018500	.001900	.....	.....	
10,800	54,000	.021000	.002500	.....	.....	
11,200	56,000	.023500	.002500	.....	.....	
11,600	58,000	.026500	.003000	.....	.....	
12,000	60,000	.029250	.002750	.....	.....	
12,800	64,000	.0350	.005750	.....	.....	
13,600	68,000	.0400	.0050	.....	.....	
14,400	72,000	.0550	.0150	.....	.....	
15,200	76,000	.0750	.0200	.....	.....	
15,460	77,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,300
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1000
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.40 from neck
Character of broken surface		granular 55 per cent, dull silky 45 per cent
Elongation of inch sections		″.08, ″.12[a]

No. 6058.

Marks, 5303.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
7,400	37,000	.001500	.000500	.....	.....	Elastic limit.
7,600	38,000	.001650	.000150	.....	.....	
7,800	39,000	.002400	.000750	.....	.....	
8,000	40,000	.004500	.002100	.....	.....	
8,400	42,000	.006600	.002100	.....	.....	
8,800	44,000	.008900	.002300	.....	.....	
9,200	46,000	.010950	.002050	.....	.....	
9,600	48,000	.012500	.001550	.....	.....	
10,000	50,000	.014650	.002150	.....	.....	
10,400	52,000	.016500	.001850	.....	.....	
10,800	54,000	.019000	.002500	.....	.....	
11,200	56,000	.021100	.002100	.....	.....	
11,600	58,000	.023250	.002150	.....	.....	
12,000	60,000	.026600	.003350	.....	.....	
12,800	64,000	.0300	.0034	.....	.....	
13,600	68,000	.0400	.0100	.....	.....	
14,400	72,000	.0500	.0100	.....	.....	
15,200	76,000	.0650	.0150	.....	.....	
16,000	80,000	.1000	.0350	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,000
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".5 from neck
Character of broken surface		granular
Elongation of inch sections		".11, ".10

No. 6059.

Marks, 5311.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,400	37,000	.001400	.000400	.....	.....	Elastic limit.
7,600	38,000	.001550	.000150	.....	.....	
7,800	39,000	.001950	.000400	.....	.....	
8,000	40,000	.002300	.000350	.....	.....	
8,200	41,000	.002650	.000350	.....	.....	
8,400	42,000	.003450	.000800	.....	.....	
8,800	44,000	.004800	.001350	.....	.....	
9,200	46,000	.006500	.001700	.....	.....	
9,600	48,000	.008150	.001650	.....	.....	
10,000	50,000	.010100	.001950	.....	.....	
10,400	52,000	.012000	.001900	.....	.....	
10,800	54,000	.013800	.001800	.....	.....	
11,200	56,000	.016000	.002200	.....	.....	
11,600	58,000	.017950	.001950	.....	.....	
12,000	60,000	.020900	.002950	.....	.....	
12,800	64,000	.0250	.0041	.....	.....	
13,600	68,000	.0300	.0050	.....	.....	
14,000	72,000	.0400	.0100	.....	.....	
15,200	76,000	.0500	.0100	.....	.....	
15,790	78,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,950
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.0650
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		″.4 from neck
Character of broken surface		granular
Elongation of inch sections		″.07*, ″.06

No. 6060.

Marks, 5318.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
6,800	34,000	.001450	.000450	.....	.....	Elastic limit.
7,000	35,000	.001500	.000050	.....	.....	
7,200	36,000	.001650	.000150	.....	.....	
7,400	37,000	.002000	.000350	.....	.....	
7,600	38,000	.002650	.000650	.....	.....	
7,800	39,000	.003500	.000850	.....	.....	
8,000	40,000	.004200	.000700	.....	.....	
8,400	42,000	.005950	.001750	.....	.....	
8,800	44,000	.007450	.001500	.....	.....	
9,200	46,000	.009500	.002050	.....	.....	
9,600	48,000	.011250	.001750	.....	.....	
10,000	50,000	.013250	.002000	.....	.....	
10,400	52,000	.015500	.002250	.....	.....	
10,800	54,000	.017750	.002250	.....	.....	
11,200	56,000	.020800	.002550	.....	.....	
11,600	58,000	.022900	.002600	.....	.....	
12,000	60,000	.025750	.002850	.....	.....	
19,800	64,000	.0300	.004250	.....	.....	
13,600	68,000	.0400	.0100	.....	.....	
14,400	72,000	.0600	.0100	.....	.....	
15,200	76,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,000
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	.0700
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.2 from neck
Character of broken surface		granular 80 per cent, dull silky 20 per cent
Elongation of inch sections		″.08*, ″.06

No. 6061.

Marks, 5090.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000400	.000300			
4,000	20,000	.000700	.000300			
6,000	30,000	.001000	.000300	0.		
7,800	39,000	.001500	.000500			Elastic limit.
8,000	40,000	.001650	.000150			
8,200	41,000	.001950	.000300			
8,400	42,000	.004500	.002550			
8,600	43,000	.007150	.002650			
8,800	44,000	.008300	.001150			
9,200	46,000	.009900	.001600			
9,600	48,000	.011750	.001850			
10,000	50,000	.013800	.002050			
10,400	52,000	.015650	.001850			
10,800	54,000	.017500	.001850			
11,200	56,000	.019750	.002250			
11,600	58,000	.021600	.001850			
12,000	60,000	.024300	.002700			
12,800	64,000	.0300	.0057			
13,600	68,000	.0350	.0050			
14,400	72,000	.0400	.0050			
15,200	76,000	.0500	.0100			
15,890	79,450					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	79,450
Elastic limit per square inch of original section	do...	89,000
Elongation per inch after rupture	inch..	.0700
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".6 from neck
Character of broken surface		granular, dull silky spot at circumference
Elongation of inch sections		".07⁸, ".07

1,000-Pound Shells.

No. 5979.

Marks, 4933.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000100	.000050	.....	.....	
3,000	15,000	.000400	.000300	.....	.....	
4,000	20,000	.000550	.000150	.....	.....	
5,000	25,000	.000650	.000100	.....	.....	
6,000	30,000	.000950	.000300	0.	.....	
7,200	36,000	.001150	.000200	.....	.....	
7,400	37,000	.001200	.000050	.....	.....	Elastic limit.
7,600	38,000	.001500	.000300	.....	.....	
7,800	39,000	.001950	.000450	.....	.....	
8,000	40,000	.005450	.003500	.003950	.003950	
8,200	41,000	.006400	.000950	.....	.....	
8,400	42,000	.007600	.001200	.....	.....	
8,800	44,000	.009400	.001800	.....	.....	
9,200	46,000	.011500	.002100	.....	.....	
9,600	48,000	.013400	.001900	.....	.....	
10,000	50,000	.015600	.002200	.....	.....	
10,400	52,000	.017600	.002000	.....	.....	
10,800	54,000	.020000	.002400	.....	.....	
11,200	56,000	.022500	.002500	.....	.....	
11,600	58,000	.025000	.002500	.....	.....	
12,000	60,000	.028050	.003050	.....	.....	
12,800	64,000	.0350	.006950	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
15,200	76,000	.0750	.0200	.....	.....	
15,820	79,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	79,100
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.6 from neck
Character of broken surface		granular, dull silky spot at the circumference
Elongation of inch sections		″.10, ″.11*

No. 5980.

Marks, 4942.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000350	.000250			
3,000	15,000	.000500	.000150			
4,000	20,000	.000650	.000150			
5,000	25,000	.000850	.000200			
6,000	30,000	.000950	.000100	0.		
8,000	40,000	.001450	.000500			
8,600	43,000	.001550	.000100			Elastic limit.
8,800	44,000	.001700	.000150			
9,000	45,000	.008750	.007050			
9,200	46,000	.009600	.000850			
9,400	47,000	.010250	.000650			
9,600	48,000	.011250	.001000			
9,800	49,000	.012250	.001000			
10,000	50,000	.012900	.000650			
10,400	52,000	.015500	.002600			
10,800	54,000	.017000	.001500			
11,200	56,000	.019250	.002250			
11,600	58,000	.022000	.002750			
12,000	60,000	.024500	.002500			
12,800	64,000	.0300	.0055			
13,600	68,000	.0400	.0100			
14,400	72,000	.0500	.0100			
14,940	74,700					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	74,700
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.0600
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".25 from neck
Character of broken surface		granular 40 per cent, dull silky, 60 per cent
Elongation of inch sections		".05, ".07+

No. 5981.

Marks, 4950.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000850	.000200	.....	.....	
6,000	30,000	.001000	.000150	0.	.....	
8,000	40,000	.001450	.000450	.....	.....	Elastic limit.
8,200	41,000	.001600	.000150	.....	.....	
8,400	42,000	.001950	.000350	.....	.....	
8,600	43,000	.008400	.006450	.....	.....	
8,800	44,000	.009000	.000600	.....	.....	
9,000	45,000	.009750	.000750	.....	.....	
9,200	46,000	.010900	.001150	.....	.....	
9,600	48,000	.013000	.002100	.....	.....	
10,000	50,000	.015000	.002000	.....	.....	
10,400	52,000	.017400	.002400	.....	.....	
10,800	54,000	.019000	.001600	.....	.....	
11,200	56,000	.022000	.003000	.....	.....	
11,600	58,000	.024650	.002650	.....	.....	
12,000	60,000	.027900	.003250	.....	.....	
12,800	64,000	.0350	.0071	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
15,200	76,000	.0700	.0150	.....	.....	
15,280	76,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,400
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".25 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".08, ".09"

No. 5982.

Marks, 4957.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000800	.000200	.....	.....	
6,000	30,000	.001000	.000200	.000050	.000050	
6,600	33,000	.001150	.000150	.....	.....	
6,800	34,000	.001200	.000050	.....	.....	
7,000	35,000	.001300	.000100	.....	.....	
7,200	36,000	.001350	.000050	.....	.....	
7,400	37,000	.001400	.000050	.....	.....	
7,600	38,000	.001450	.000050	.....	.....	Elastic limit.
7,800	39,000	.001650	.000200	.....	.....	
8,000	40,000	.001800	.000150	.....	.....	
8,200	41,000	.001950	.000150	.....	.....	
8,400	42,000	.002200	.000250	.....	.....	
8,600	43,000	.002850	.000650	.....	.....	
8,800	44,000	.003400	.000550	.....	.....	
9,000	45,000	.004000	.000600	.....	.....	
9,200	46,000	.004550	.000550	.....	.....	
9,600	48,000	.006100	.001550	.....	.....	
10,000	50,000	.007950	.001850	.....	.....	
10,400	52,000	.009000	.001050	.....	.....	
10,800	54,000	.011100	.002100	.....	.....	
11,200	56,000	.013000	.001900	.....	.....	
11,600	58,000	.014750	.001750	.....	.....	
12,000	60,000	.017150	.002400	.....	.....	
12,800	64,000	.0250	.007850	.....	.....	
13,600	68,000	.0300	.0050	.....	.....	
14,400	72,000	.0350	.0050	.....	.....	
15,200	76,000	.0450	.0100	.....	.....	
15,610	78,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,050
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.0500
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		″.85 from neck
Character of broken surface		granular, varying in size
Elongation of inch sections		″.04, ″.06*

No. 5983.

Marks. 4964.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000500	.000200	.....	.....	
4,000	20,000	.000650	.000150	.....	.....	
5,000	25,000	.000850	.000200	.....	.....	
6,000	30,000	.001000	.000150	0.	.....	
7,000	35,000	.001200	.000200	.....	.....	
7,200	36,000	.001300	.000100	.....	.....	
7,400	37,000	.001450	.000150	.....	.....	
7,600	38,000	.001500	.000050	.....	.....	
7,800	39,000	.001600	.000100	.....	.....	Elastic limit.
8,000	40,000	.001850	.000250	.....	.....	
8,200	41,000	.002100	.000250	.....	.....	
8,400	42,000	.002500	.000400	.....	.....	
8,600	43,000	.002950	.000450	.....	.....	
8,800	44,000	.003600	.000650	.....	.....	
9,000	45,000	.004100	.000500	.....	.....	
9,200	46,000	.005000	.000900	.....	.....	
9,600	48,000	.006500	.001500	.....	.....	
10,000	50,000	.008050	.001550	.....	.....	
10,400	52,000	.009500	.001450	.....	.....	
10,800	54,000	.011250	.001750	.....	.....	
11,200	56,000	.013050	.001800	.....	.....	
11,600	58,000	.015000	.001950	.....	.....	
12,000	60,000	.017000	.002000	.....	.....	
12,800	64,000	.0200	.0030	.....	.....	
13,600	68,000	.0230	.0060	.....	.....	
14,400	72,000	.0350	.0100	.....	.....	
15,200	76,000	.0450	.0100	.....	.....	
15,540	77,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,700
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.0450
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		".75 from neck
Character of broken surface		granular, varying in size
Elongation of inch sections		".04, ".06*

No. 5984.

Marks, 4972.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000200	.000100	.....	.....	
3,000	15,000	.000400	.000200	.....	.....	
4,000	20,000	.000550	.000150	.....	.....	
5,000	25,000	.000700	.000150	.....	.....	
6,000	30,000	.000950	.000250	0.	.....	
7,400	37,000	.001300	.000350	.....	.....	
7,600	38,000	.001350	.000050	.....	.....	
7,800	39,000	.001400	.000050	.....	.....	Elastic limit.
8,000	40,000	.001600	.000200	.....	.....	
8,200	41,000	.001850	.000250	.....	.....	
8,400	42,000	.002050	.000200	.....	.....	
8,600	43,000	.002450	.000400	.....	.....	
8,800	44,000	.002950	.000500	.....	.....	
9,000	45,000	.003400	.000450	.....	.....	
9,200	46,000	.004200	.000800	.....	.....	
9,600	48,000	.005900	.001700	.....	.....	
10,000	50,000	.007400	.001500	.....	.....	
10,400	52,000	.009000	.001600	.....	.....	
10,800	54,000	.010700	.001700	.....	.....	
11,200	56,000	.012400	.001700	.....	.....	
11,600	58,000	.014150	.001750	.....	.....	
12,000	60,000	.016550	.002400	.....	.....	
12,800	64,000	.0200	.003450	.....	.....	
13,600	68,000	.0250	.0050	.....	.....	
14,400	72,000	.0350	.0100	.....	.....	
15,100	75,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	75,500
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.0400
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		".30 from neck
Character of broken surface		granular, varying in size
Elongation of inch sections		".04, ".04*

No. 5989.

Marks, 5014.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001050	.000400	0.	.....	
8,000	40,000	.001600	.000550	.....	.....	Elastic limit.
8,200	41,000	.002000	.000400	.....	.....	
8,400	42,000	.009500	.007500	.....	.....	
8,600	43,000	.010000	.000500	.....	.....	
8,800	44,000	.010500	.000500	.....	.....	
9,200	46,000	.011750	.001250	.....	.....	
9,600	48,000	.014500	.002750	.....	.....	
10,000	50,000	.016500	.002000	.....	.....	
10,400	52,000	.018600	.002100	.....	.....	
10,800	54,000	.020750	.002150	.....	.....	
11,200	56,000	.024000	.003250	.....	.....	
11,600	58,000	.026500	.002500	.....	.....	
12,000	60,000	.029750	.003250	.....	.....	
12,400	62,000	.033250	.003500	.....	.....	
12,800	64,000	.037000	.003750	.....	.....	
13,200	66,000	.042000	.005000	.....	.....	
13,600	68,000	.048750	.006750	.....	.....	
14,120	70,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70,600
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.0650
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		".05 from neck
Character of broken surface		granular 40 per cent, dull silky 60 per cent
Elongation of inch sections		".08*, ".05

No. 5990.

Marks, 5020.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000700	.000350	.....	.....	
6,000	30,000	.001050	.000350	0.	.....	
7,000	35,000	.001400	.000350	.....	.....	
7,200	36,000	.001450	.000050	.....	.....	
7,400	37,000	.001500	.000050	.....	.....	
7,600	38,000	.001550	.000050	.....	.....	Elastic limit.
7,800	39,000	.001800	.000250	.....	.....	
8,000	40,000	.002000	.000200	.....	.....	
8,200	41,000	.006500	.004500	.....	.....	
8,400	42,000	.007900	.001400	.....	.....	
8,800	44,000	.010000	.002100	.....	.....	
9,200	46,000	.011750	.001750	.....	.....	
9,600	48,000	.013750	.002000	.....	.....	
10,000	50,000	.016000	.002250	.....	.....	
10,400	52,000	.018100	.002100	.....	.....	
10,800	54,000	.020500	.002400	.....	.....	
11,200	56,000	.023250	.002750	.....	.....	
11,600	58,000	.026000	.002750	.....	.....	
12,000	60,000	.029550	.003550	.....	.....	
12,800	64,000	.0400	.010450	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0600	.0100	.....	.....	
14,510	72,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,550
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.0800
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".9 from neck
Character of broken surface		granular 50 per cent, dull silky 50 per cent
Elongation of inch sections		".09*, ".07

No. 5991.

Marks, 5037.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
7,600	38,000	.001550	.000550	.....	.....	
7,800	39,000	.001600	.000050	.....	.....	Elastic limit.
8,000	40,000	.001850	.000250	.....	.....	
8,200	41,000	.002500	.000650	.....	.....	
8,400	42,000	.007500	.005000	.....	.....	
8,600	43,000	.008500	.001000	.....	.....	
8,800	44,000	.009500	.001000	.....	.....	
9,200	46,000	.011250	.001750	.....	.....	
9,600	48,000	.013150	.001900	.....	.....	
10,000	50,000	.015500	.002350	.....	.....	
10,400	52,000	.017300	.001800	.....	.....	
10,800	54,000	.019500	.002200	.....	.....	
11,200	56,000	.022250	.002750	.....	.....	
11,600	58,000	.024400	.002150	.....	.....	
12,000	60,000	.027500	.003100	.....	.....	
12,800	64,000	.0350	.0075	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0500	.0050	.....	.....	
15,200	76,000	.0700	.0200	.....	.....	
16,000	80,000	.1000	.0300	.....	.....	
16,020	80,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,100
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		18.2
Position of rupture		".8 from neck
Character of broken surface		granular, dull silky spot at the circumference
Elongation of inch sections		".10, ".11*

No. 5992.

Marks, 5044.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
8,000	40,000	.001550	.000550	.....	.....	
8,200	41,000	.001650	.000100	.....	.....	Elastic limit
8,400	42,000	.002000	.000350	.....	.....	
8,600	43,000	.007500	.005500	.....	.....	
8,800	44,000	.008750	.001250	.....	.....	
9,000	45,000	.009250	.000500	.....	.....	
9,200	46,000	.010050	.000800	.....	.....	
9,600	48,000	.012250	.002200	.....	.....	
10,000	50,000	.014000	.001750	.....	.....	
10,400	52,000	.016000	.002000	.....	.....	
10,800	54,000	.018100	.002100	.....	.....	
11,200	56,000	.020600	.002500	.....	.....	
11,600	58,000	.023000	.002400	.....	.....	
12,000	60,000	.025650	.002650	.....	.....	
12,800	64,000	.0350	.009350	.....	.....	
13,600	68,000	.0400	.0050	.....	.....	
14,400	72,000	.0500	.0100	.....	.....	
15,200	76,000	.0650	.0150	.....	.....	
16,000	80,000	.0850	.0200	.....	.....	
16,410	82,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,050
Elastic limit per square inch of original section	do...	41,000
Elongation per inch after rupture	inch..	.1200
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		".3 from neck
Character of broken surface		granular 80 per cent, dull silky 20 per cent
Elongation of inch sections		".13", ".11

No. 5993.

Marks, 5050.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,800	39,000	.001600	.000600	.....	.....	Elastic limit.
8,000	40,000	.002250	.000650	.....	.....	
8,200	41,000	.008000	.005750	.....	.....	
8,400	42,000	.009000	.001000	.....	.....	
8,600	43,000	.010000	.001000	.....	.....	
8,800	44,000	.010500	.000500	.....	.....	
9,200	46,000	.012600	.002100	.....	.....	
9,600	48,000	.014500	.001900	.....	.....	
10,000	50,000	.016500	.002000	.....	.....	
10,400	52,000	.019400	.002900	.....	.....	
10,800	54,000	.021900	.002500	.....	.....	
11,200	56,000	.024250	.002350	.....	.....	
11,600	58,000	.027000	.002750	.....	.....	
12,000	60,000	.030400	.003400	.....	.....	
12,800	64,000	.0400	.0096	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0600	.0100	.....	.....	
15,200	76,000	.0800	.0200	.....	.....	
15,960	79,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	79,800
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1200
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		".9 from neck
Character of broken surface		granular, silky spot at the circumference
Elongation of inch sections		".13*, ".11

No. 5994.

Marks, 5057.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
8,000	40,000	.001500	.000500	.....	.....	
8,600	43,000	.001750	.000250	.....	.....	Elastic limit.
8,800	44,000	.001850	.000100	.....	.....	
9,000	45,000	.001950	.000100	.....	.....	
9,200	46,000	.010500	.008550	.....	.....	
9,400	47,000	.011000	.000500	.....	.....	
9,600	48,000	.011400	.000400	.....	.....	
9,800	49,000	.011650	.000250	.....	.....	
10,000	50,000	.012150	.000500	.....	.....	
10,400	52,000	.014000	.001850	.....	.....	
10,800	54,000	.016500	.002500	.....	.....	
11,200	56,000	.019000	.002500	.....	.....	
11,600	58,000	.021250	.002200	.....	.....	
12,000	60,000	.023500	.002250	.....	.....	
12,800	64,000	.0300	.0065	.....	.....	
13,600	68,000	.0400	.0100	.....	.....	
14,400	72,000	.0450	.0050	.....	.....	
15,200	76,000	.0600	.0150	.....	.....	
16,000	80,000	.0800	.0200	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,000
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".35 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".[illegible], ".08

No. 5995.

Marks, 5070.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.000050	.000050	
7,800	39,000	.001550	.000550	.....	.....	
8,000	40,000	.001600	.000050	.....	.....	Elastic limit.
8,200	41,000	.008000	.006400	.....	.....	
8,400	42,000	.008650	.000650	.....	.....	
8,600	43,000	.009250	.000600	.....	.....	
8,800	44,000	.010250	.001000	.....	.....	
9,200	46,000	.012250	.002000	.....	.....	
9,600	48,000	.014000	.001750	.....	.....	
10,000	50,000	.015750	.001750	.....	.....	
10,400	52,000	.018150	.002400	.....	.....	
10,800	54,000	.021000	.002850	.....	.....	
11,200	56,000	.023600	.002600	.....	.....	
11,600	58,000	.026500	.002900	.....	.....	
12,000	60,000	.029500	.003000	.....	.....	
12,800	64,000	.0400	.0105	.....	.....	
13,600	68,000	.0450	.0050	.....	.....	
14,400	72,000	.0600	.0150	.....	.....	
15,200	76,000	.0800	.0200	.....	.....	
16,000	80,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,000
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.1200
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.55 from neck
Character of broken surface		granular, dull silky spot at circumference
Elongation of inch sections		″.11, ″.13*

No. 5996.

Marks, 5077.
Diameters, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001050	.000400	0.	.....	
7,600	38,000	.001600	.000550	.....	.....	Elastic limit.
7,800	39,000	.001800	.000200	.....	.....	
8,000	40,000	.002000	.000200	.....	.....	
8,200	41,000	.002500	.000500	.....	.....	
8,400	42,000	.007500	.005000	.....	.....	
8,600	43,000	.008850	.001350	.....	.....	
8,800	44,000	.009500	.000650	.....	.....	
9,200	46,000	.011250	.001750	.....	.....	
9,600	48,000	.013300	.002050	.....	.....	
10,000	50,000	.015250	.001950	.....	.....	
10,400	52,000	.017250	.002000	.....	.....	
10,800	54,000	.020000	.002750	.....	.....	
11,200	56,000	.022650	.002650	.....	.....	
11,600	58,000	.025500	.002850	.....	.....	
12,000	60,000	.028500	.003000	.....	.....	
12,800	64,000	.0400	.0115	.....	.....	
13,600	68,000	.0450	.0050	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
15,200	76,000	.0750	.0200	.....	.....	
15,720	78,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,600
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch...	.1000
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.025
Reduction of area after rupture, per cent of original section		9.5
Position of rupture		25". from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".09, ".11*

No. 5997.

Marks, 5083.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.000050	.000050	
8,000	40,000	.001500	.000500	.....	.....	
8,200	41,000	.001550	.000050	.....	.....	
8,400	42,000	.001600	.000050	.....	.....	Elastic limit.
8,600	43,000	.001850	.000250	.....	.....	
8,800	44,000	.008250	.006400	.....	.....	
9,000	45,000	.009500	.001250	.....	.....	
9,200	46,000	.010500	.001000	.....	.....	
9,600	48,000	.012400	.001900	.....	.....	
10,000	50,000	.014500	.002100	.....	.....	
10,400	52,000	.016100	.001600	.....	.....	
10,800	54,000	.018500	.002400	.....	.....	
11,200	56,000	.021000	.002500	.....	.....	
11,600	58,000	.023500	.002500	.....	.....	
12,000	60,000	.026650	.003150	.....	.....	
12,800	64,000	.0350	.008350	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0500	.0050	.....	.....	
14,900	74,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	74,500
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.0650
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".75 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".08*, ".05

No. 5998.

Marks, 5097.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000650	.000250	.....	.....	
4,000	20,000	.000650	.000900	.....	.....	
6,000	30,000	.001000	.000850	0.	.....	
7,400	37,000	.001450	.000450	.....	.....	Elastic limit.
7,600	38,000	.001600	.000150	.....	.....	
7,800	39,000	.002400	.000800	.....	.....	
8,000	40,000	.006500	.004100	.....	.....	
8,200	41,000	.008500	.002000	.....	.....	
8,400	42,000	.009300	.000800	.....	.....	
8,800	44,000	.011150	.001180	.....	.....	
9,200	46,000	.013500	.002350	.....	.....	
9,600	48,000	.015500	.002000	.....	.....	
10,000	50,000	.017650	.002150	.....	.....	
10,400	52,000	.019750	.002100	.....	.....	
10,800	54,000	.022900	.003150	.....	.....	
11,200	56,000	.025150	.002250	.....	.....	
11,600	58,000	.028250	.003100	.....	.....	
12,000	60,000	.031900	.003650	.....	.....	
12,800	64,000	.0400	.0081	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0650	.0150	.....	.....	
15,200	76,000	.0900	.0250	.....	.....	
15,780	78,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,900
Elastic limit per square inch of original section	do...	87,000
Elongation per inch after rupture	inch..	.1350
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		″.45 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		″.16*, ″.11

No. 5999.

Marks, 5104.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
6,600	33,000	.001250	.000250	.....	.....	Elastic limit.
6,800	34,000	.001400	.000150	.....	.....	
7,000	35,000	.001600	.000200	.....	.....	
7,200	36,000	.002600	.001000	.....	.....	
7,400	37,000	.003750	.001150	.....	.....	
7,600	38,000	.005000	.001250	.....	.....	
7,800	39,000	.005900	.000900	.....	.....	
8,000	40,000	.006900	.001000	.....	.....	
8,400	42,000	.008650	.001750	.....	.....	
8,800	44,000	.010500	.001850	.....	.....	
9,200	46,000	.012750	.002250	.....	.....	
9,600	48,000	.014500	.001750	.....	.....	
10,000	50,000	.017000	.002500	.....	.....	
10,400	52,000	.018900	.001900	.....	.....	
10,800	54,000	.021750	.002850	.....	.....	
11,200	56,000	.024150	.002400	.....	.....	
11,600	58,000	.027650	.003500	.....	.....	
12,000	60,000	.032000	.004350	.....	.....	
15,200	76,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,000
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.1000
Elongation per inch under strain at elastic limit	do...	.001250
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".7 from neck
Character of broken surface		granular
Elongation of inch sections		".10, ".10*

No. 6000.

Marks, 5109.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,000	35,000	.001300	.000300	.....	.....	
7,200	36,000	.001400	.000100	.....	.....	
7,400	37,000	.001450	.000050	.....	.....	
7,600	38,000	.001500	.000050	.....	.....	
7,800	39,000	.001550	.000050	.....	.....	Elastic limit.
8,000	40,000	.001700	.000150	.....	.....	
8,200	41,000	.001850	.000150	.....	.....	
8,400	42,000	.009400	.007550	.....	.....	
8,600	43,000	.010500	.001100	.....	.....	
8,800	44,000	.011400	.000900	.....	.....	
9,200	46,000	.013150	.001750	.....	.....	
9,600	48,000	.015500	.002350	.....	.....	
10,000	50,000	.018000	.002500	.....	.....	
10,400	52,000	.020100	.002100	.....	.....	
10,800	54,000	.023150	.003050	.....	.....	
11,200	56,000	.025600	.002450	.....	.....	
11,600	58,000	.028750	.003150	.....	.....	
12,000	60,000	.032500	.003750	.....	.....	
12,800	64,000	.0450	.0125	.....	.....	
13,600	68,000	.0500	.0050	.....	.....	
14,400	72,000	.0650	.0150	.....	.....	
15,120	75,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	75,600
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		1" from neck
Character of broken surface		granular, 40 per cent, dull silky 60 per cent
Elongation of inch sections		".09, ".12

No. 6006.

Marks, 5063.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	.....	.....	
7,600	38,000	.001300	.000150	.....	.....	
7,800	39,000	.001350	.000050	.....	.....	Elastic limit.
8,000	40,000	.001650	.000300	.....	.....	
8,200	41,000	.006500	.004850	.....	.....	
8,400	42,000	.007950	.001450	.....	.....	
8,800	44,000	.009500	.001550	.....	.....	
9,200	46,000	.011900	.002400	.....	.....	
9,600	48,000	.013950	.002050	.....	.....	
10,000	50,000	.015900	.001950	.....	.....	
10,400	52,000	.017600	.001700	.....	.....	
10,800	54,000	.020000	.002400	.....	.....	
11,200	56,000	.022500	.002500	.....	.....	
11,600	58,000	.025300	.002800	.....	.....	
12,000	60,000	.028350	.003050	.....	.....	
12,800	64,000	.0400	.011650	.....	.....	
13,600	68,000	.0450	.0050	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
15,200	76,000	.0750	.0200	.....	.....	
15,920	79,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	79,600
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1000
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".3 from neck
Character of broken surface		granular 85 per cent, dull silky 15 per cent.
Elongation of inch sections		".12*, ".08

No. 6007.

Marks, 5090.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	
1,000	5,000	.000200	.000200	.....	.....	Initial load.
2,000	10,000	.000450	.000250	.....	.....	
4,000	20,000	.000850	.000400	.....	.....	
6,000	30,000	.001150	.000300	0.	.....	
7,000	35,000	.001350	.000200	.....	.....	
7,800	39,000	.001500	.000150	.....	.....	Elastic limit.
8,000	40,000	.001850	.000350	.....	.....	
8,200	41,000	.002550	.000700	.....	.....	
8,400	42,000	.004500	.001950	.....	.....	
8,600	43,000	.007500	.003000	.....	.....	
8,800	44,000	.008450	.000900	.....	.....	
9,200	46,000	.010500	.002050	.....	.....	
9,600	48,000	.012100	.001600	.....	.....	
10,000	50,000	.013750	.001650	.....	.....	
10,400	52,000	.016000	.002250	.....	.....	
10,800	54,000	.017800	.001800	.....	.....	
11,200	56,000	.019900	.002100	.....	.....	
11,600	58,000	.022400	.002500	.....	.....	
12,000	60,000	.025500	.003100	.....	.....	
12,800	64,000	.0350	.0095	.....	.....	
13,600	68,000	.0400	.0050	.....	.....	
14,400	72,000	.0500	.0100	.....	.....	
15,200	76,000	.0600	.0100	.....	.....	
16,000	80,000	.0800	.0200	.....	.....	
16,700	83,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,500
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1200
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.45 from neck
Character of broken surface		granular 85 per cent, dull silky 15 per cent
Elongation of inch sections		″.11, ″.13*

No. 6108.

Marks, 5110.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
7,000	35,000	.001300	.000300	.....	.....	
8,000	40,000	.001500	.000200	.....	.....	
8,400	42,000	.001650	.000150	.....	.....	Elastic limit.
8,600	43,000	.002000	.000350	.....	.....	
8,800	44,000	.005000	.003000	.....	.....	
9,000	45,000	.008900	.003900	.....	.....	
9,200	46,000	.009850	.000950	.....	.....	
9,600	48,000	.011400	.001550	.....	.....	
10,000	50,000	.013250	.001850	.....	.....	
10,400	52,000	.015400	.002150	.....	.....	
10,800	54,000	.017350	.001950	.....	.....	
11,200	56,000	.019350	.002000	.....	.....	
11,600	58,000	.021650	.002300	.....	.....	
12,000	60,000	.024400	.002750	.....	.....	
12,800	64,000	.0300	.0056	.....	.....	
13,600	68,000	.0350	.0050	.....	.....	
14,400	72,000	.0450	.0100	.....	.....	
15,200	76,000	.0550	.0100	.....	.....	
16,000	80,000	.0750	.0200	.....	.....	
16,420	82,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,100
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.1000
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".50 from neck
Character of broken surface		granular 85 per cent, fine silky 15 per cent
Elongation of inch sections		".08, ".12*

No. 6109.

Marks. 5119.
Diameter. ".505.
Sectional area. .20 square inch.
Gauged length. 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,000	35,000	.001350	.000350	.....	.....	
7,200	36,000	.001400	.000050	.....	.....	Elastic limit.
7,400	37,000	.001550	.000150	.....	.....	
7,600	38,000	.001700	.000150	.....	.....	
7,800	39,000	.002150	.000450	.....	.....	
8,000	40,000	.003000	.000850	.....	.....	
8,400	42,000	.004850	.001850	.....	.....	
8,800	44,000	.006600	.001750	.....	.....	
9,200	46,000	.008850	.002250	.....	.....	
9,600	48,000	.011500	.002650	.....	.....	
10,000	50,000	.014750	.003250	.....	.....	
10,400	52,000	.018750	.004000	.....	.....	
10,800	54,000	.023500	.004750	.....	.....	
11,200	56,000	.028750	.005250	.....	.....	
11,600	58,000	.034750	.006000	.....	.....	
12,000	60,000	.041500	.006750	.....	.....	
12,800	64,000	.0600	.0185	.....	.....	
13,600	68,000	.0800	.0200	.....	.....	
14,400	72,000	.1000	.0200	.....	.....	
15,200	76,000	.1250	.0250	.....	.....	
15,550	77,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,600
Elastic limit per square inch of original section	do...	36,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".7 from neck
Character of broken surface		granular 70 per cent, dull silky 30 per cent
Elongation of inch sections		".10, ".12[8]

No. 6010.

Marks, 5127.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.000950	.000350	0.	.....	
7,000	35,000	.001100	.000150	.....	.....	
7,800	39,000	.001350	.000250	.....	.....	
8,000	40,000	.001450	.000100	.....	.....	
8,200	41,000	.001500	.000050	.....	.....	
8,400	42,000	.001550	.000050	.....	.....	Elastic limit.
8,600	43,000	.008600	.007050	.....	.....	
8,800	44,000	.009150	.000550	.....	.....	
9,000	45,000	.010100	.000950	.....	.....	
9,200	46,000	.010850	.000750	.....	.....	
9,600	48,000	.013000	.002150	.....	.....	
10,000	50,000	.014900	.001900	.....	.....	
10,400	52,000	.017000	.002100	.....	.....	
10,800	54,000	.019000	.002000	.....	.....	
11,200	56,000	.021550	.002550	.....	.....	
11,600	58,000	.024500	.002950	.....	.....	
12,000	60,000	.027400	.002900	.....	.....	
12,800	64,000	.0350	.0076	.....	.....	
13,600	68,000	.0450	.0100	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
14,540	72,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,700
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.0700
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		".6 from neck
Character of broken surface		granular 40 per cent, dull silky 60 per cent
Elongation of inch sections		".08*, ".06

No. 6011.

Marks, 5134.
Diameter ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000550	.000200	.....	.....	
6,000	30,000	.000950	.000400	0.	.....	
7,000	35,000	.001150	.000200	.....	.....	
7,200	36,000	.001200	.000050	.....	.....	
7,400	37,000	.001250	.000050	.....	.....	Elastic limit.
7,600	38,000	.001350	.000100	.....	.....	
7,800	39,000	.001500	.000150	.....	.....	
8,000	40,000	.001650	.000150	.....	.....	
8,200	41,000	.002700	.001050	.....	.....	
8,400	42,000	.008900	.006100	.....	.....	
8,800	44,000	.010650	.001750	.....	.....	
9,200	46,000	.012400	.001850	.....	.....	
9,600	48,000	.014400	.002000	.....	.....	
10,000	50,000	.016550	.002150	.....	.....	
10,400	52,000	.018900	.002350	.....	.....	
10,800	54,000	.021400	.002500	.....	.....	
11,200	56,000	.024100	.002700	.....	.....	
11,600	58,000	.026750	.002650	.....	.....	
12,000	60,000	.029750	.003000	.....	.....	
12,800	64,000	.0400	.010250	.....	.....	
13,600	68,000	.0500	.0100	.....	.....	
14,400	72,000	.0600	.0100	.....	.....	
15,200	76,000	.0800	.0200	.....	.....	
15,610	78,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,050
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001250
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		#.9 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		#.10, #.11*

No. 6012.

Marks, 5140.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,000	35,000	.001200	.000200	.....	.....	
8,000	40,000	.001500	.000300	.....	.....	Elastic limit.
8,200	41,000	.001900	.000400	.....	.....	
8,400	42,000	.007250	.005350	.....	.....	
8,600	43,000	.008450	.001200	.....	.....	
8,800	44,000	.009350	.000900	.....	.....	
9,200	46,000	.011000	.001650	.....	.....	
9,600	48,000	.013000	.002000	.....	.....	
10,000	50,000	.015000	.002000	.....	.....	
10,400	52,000	.017250	.002250	.....	.....	
10,800	54,000	.019500	.002250	.....	.....	
11,200	56,000	.022250	.002750	.....	.....	
11,600	58,000	.025000	.002750	.....	.....	
12,000	60,000	.027500	.002500	.....	.....	
12,800	64,000	.0400	.0125	.....	.....	
13,600	68,000	.0450	.0050	.....	.....	
14,400	72,000	.0550	.0100	.....	.....	
15,200	76,000	.0700	.0150	.....	.....	
15,210	76,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,050
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.0600
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".9 from neck
Character of broken surface		granular, dull silky at circumference
Elongation of inch sections		".07, ".09*

No. 6013.

Marks, 5146.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
7,000	35,000	.001350	.000350	.....	.....	
7,600	38,000	.001550	.000200	.....	.....	Elastic limit.
7,800	39,000	.001850	.000300	.....	.....	
8,000	40,000	.007500	.005650	.....	.....	
8,200	41,000	.008450	.000950	.....	.....	
8,400	42,000	.009250	.000800	.....	.....	
8,800	44,000	.011500	.002250	.....	.....	
9,200	46,000	.013450	.001950	.....	.....	
9,600	48,000	.015850	.002400	.....	.....	
10,000	50,000	.018250	.002400	.....	.....	
10,400	52,000	.020500	.002250	.....	.....	
10,800	54,000	.023350	.002850	.....	.....	
11,200	56,000	.026250	.002900	.....	.....	
11,600	58,000	.029000	.002750	.....	.....	
12,000	60,000	.033000	.004000	.....	.....	
12,800	64,000	.0450	.0120	.....	.....	
13,600	68,000	.0550	.0100	.....	.....	
14,400	72,000	.0700	.0150	.....	.....	
15,020	75,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	75,100
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.0950
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".45 from neck
Character of broken surface		granular 60 per cent, dull silky 40 per cent
Elongation of inch sections		".08, ".11

No. 6062.

Marks, 5110.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000700	.000350	.....	.....	
5,600	28,000	.001000	.000300	.....	.....	
5,800	29,000	.001100	.000100	.....	.....	Elastic limit.
6,000	30,000	.001450	.000350	.000450	.000450	
6,200	31,000	.001600	.000150	.....	.....	
6,400	32,000	.001850	.000250	.....	.....	
6,600	33,000	.002000	.000150	.....	.....	
6,800	34,000	.002100	.000100	.....	.....	
7,000	35,000	.002200	.000100	.001000	.000550	
7,200	36,000	.002500	.000300	.....	.....	
7,400	37,000	.002750	.000250	.....	.....	
7,600	38,000	.003250	.000500	.....	.....	
7,800	39,000	.004000	.000750	.....	.....	
8,000	40,000	.005500	.001500	.....	.....	
8,400	42,000	.007250	.001750	.....	.....	
8,800	44,000	.009750	.002500	.....	.....	
9,200	46,000	.011550	.001800	.....	.....	
9,600	48,000	.013500	.001950	.....	.....	
10,000	50,000	.015400	.001900	.....	.....	
10,400	52,000	.017500	.002100	.....	.....	
10,800	54,000	.020000	.002500	.....	.....	
11,200	56,000	.022500	.002500	.....	.....	
11,600	58,000	.024500	.002000	.....	.....	
12,000	60,000	.027650	.003150	.....	.....	
15,200	76,000	.0600	.032350	.....	.....	
15,920	79,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	79,600
Elastic limit per square inch of original section	do...	29,000
Elongation per inch after rupture	inch..	.0900
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".6 from neck
Character of broken surface		granular, dull silky spot at the circumference
Elongation of inch sections		".07.".11*

TABULATION OF TENSION SPECIMENS FROM CAST-STEEL BODIES OF 800 AND 1,000 POUND B. L. MORTAR SHELLS. (STEMS 2″ LONG.)

800-POUND SHELLS.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 2 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Per ct.*	*Per ct.*		*Inch.*
6035	5158	.505	.20	38,000	68,000	6.0	5.7	Granular 40 per cent, dull silky 60 per cent	.05, .07*
6036	5161	.505	.20	39,000	78,600	9.5	9.5	Granular 85 per cent, dull silky 15 per cent	.11*, .08
6037	6087	.505	.20	38,000	78,050	12.5	13.2	Dull silky	.11, .14*
6038	5173	.505	.20	37,000	78,650	11.5	9.5	Granular 85 per cent, dull silky 15 per cent	.10, .13*
6039	5181	.505	.20	39,000	77,700	13.0	13.2	Granular 80 per cent, dull silky 20 per cent	.11, .15*
6040	5188	.505	.20	38,000	78,150	15.0	16.9	Granular 40 per cent, dull silky 60 per cent	.14, .16*
6041	5195	.505	.20	39,000	79,300	12.0	9.5	Granular 60 per cent, dull silky 40 per cent	.12, .12
6042	5202	.505	.20	34,000	80,000	12.5	13.2	Granular	.14*, .11
6043	5210	.505	.20	40,000	76,000	8.5	9.5	Granular 60 per cent, dull silky 40 per cent	.09*, .08
6044	5217	.505	.20	43,000	76,000	8.0	9.5	Granular 40 per cent, dull silky 60 per cent	.09*, .07
6045	5224	.505	.20	40,000	73,350	8.0	9.5	Granular 60 per cent, dull silky 40 per cent	.07, .09*
6046	5233	.505	.20	42,000	72,100	7.5	9.5	Granular 40 per cent, dull silky 60 per cent	.05, .08*
6047	5238	.505	.20	42,000	82,050	8.5	9.5	Granular 70 per cent, dull silky 30 per cent	.07, .10*
6048	5244	.505	.20	38,000	76,000	10.5	13.2	Granular 60 per cent, dull silky 40 per cent	.11*, .10
6050	5044	.505	.20	39,000	77,050	8.5	5.7	Granular, dull spot at circumference	.09*, .08
6051	5254	.505	.20	39,000	73,050	7.0	9.5	Granular 60 per cent, dull silky 40 per cent	.08*, .06
6052	5261	.505	.20	37,000	76,000	8.0	9.5	Granular 80 per cent, dull silky 20 per cent	.06, .10*
6053	5268	.505	.20	37,000	81,000	8.5	9.5	Granular	.07, .10*
6054	5273	.505	.20	37,000	73,000	7.0	9.5	Granular 70 per cent, dull silky 30 per cent	.07*, .07*
6055	5280	.505	.20	36,000	73,050	8.0	9.5	Granular 60 per cent, dull silky 40 per cent	.08*, .08
6056	5288	.505	.20	42,000	83,050	11.0	13.2	.....do	.09, .13*
6057	5295	.505	.20	39,000	77,300	10.0	9.5	Granular 55 per cent, dull silky 45 per cent	.08, .12*
6058	5308	.505	.20	37,000	80,000	10.5	9.5	Granular	.11*, .10
6059	5811	.505	.20	37,000	78,950	6.5	5.7	.....do	.07*, .06
6060	5818	.505	.20	34,000	76,000	7.0	9.5	Granular 80 per cent, dull silky 20 per cent	.08*, .06
6061	5090	.505	.20	39,000	79,450	7.0	9.5	Granular, dull silky spot at the circumference	.07*, .07

TABULATION OF TENSION SPECIMENS, ETC.—Continued.

1000-POUND SHELLS.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 2 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Per ct.*	*Per ct.*		*Inch.*
5979	4933	.505	.20	37,000	79,100	10.5	13.2	Granular, dull silky spot at the circumference	.10, .11*
5980	4942	.505	.20	43,000	74,700	6.0	9.5	Granular 40 per cent, dull silky 60 per cent	.05, .07*
5981	4950	.505	.20	40,000	76,400	8.5	9.5	Granular 60 per cent, dull silky 40 per cent	.08, .09*
5982	4957	.505	.20	38,000	78,050	5.0	5.7	Granular, varying in size	.04, .06*
5983	4964	.505	.20	39,000	77,700	4.5	5.7	.....do	.04, .05*
5984	4972	.505	.20	39,000	75,500	4.0	5.7	.....do	.04, .04*
5989	5014	.505	.20	40,000	70,600	6.5	5.7	Granular 40 per cent, dull silky 60 per cent	.08*, .05
5990	5020	.505	.20	38,000	72,550	8.0	9.5	Granular 50 per cent, dull silky 50 per cent	.09*, .07
5991	5087	.505	.20	39,000	80,100	10.5	13.2	Granular, dull silky spot at the circumference	.10, .11*
5992	5044	.505	.20	41,000	82,050	12.0	13.2	Granular 80 per cent, dull silky 20 per cent	.13*, .11
5993	5050	.505	.20	39,000	79,800	12.0	13.2	Granular, silky spot at the circumference	.13*, .11
5994	5057	.505	.20	43,000	80,000	8.5	9.5	Granular 60 per cent, dull silky 40 per cent	.09*, .08
5995	5070	.505	.20	40,000	80,000	12.0	13.2	Granular, dull silky spot at the circumference	.11, .13*
5996	5077	.505	.20	38,000	78,600	10.0	9.5	Granular 60 per cent, dull silky 40 per cent	.09, .11*
5997	5088	.505	.20	42,000	74,500	6.5	9.5	.....do	.08*, .05
5998	5097	.505	.20	37,000	78,900	13.5	16.9	.....do	.16*, .11
5999	5104	.505	.20	33,000	76,000	10.0	9.5	Granular	.10, .10*
6000	5109	.505	.20	39,000	75,600	10.5	13.2	Granular 40 per cent, dull silky 60 per cent	.09, .12*
6006	5063	.505	.20	39,000	79,600	10.0	9.5	Granular 85 per cent, dull silky 15 per cent	.12*, .08
6007	5090	.505	.20	39,000	83,500	12.0	13.2	.....do	.11, .13*
6108	5110	.505	.20	42,000	82,100	10.0	9.5	.....do	.08, .12*
6109	5119	.505	.20	36,000	77,600	11.0	9.5	Granular 70 per cent, dull silky 30 per cent	.10, .12*
6110	5127	.505	.20	42,000	72,700	7.0	5.7	Granular 40 per cent, dull silky 60 per cent	.08*, .06
6011	5134	.505	.20	37,000	78,050	10.5	9.5	Granular 60 per cent, dull silky 40 per cent	.10, .11*
6012	5140	.505	.20	40,000	76,050	8.0	9.5	Granular, dull silky at the circumference	.07, .09*
6013	5146	.505	.20	38,000	75,100	9.5	9.5	Granular 60 per cent, dull silky 40 per cent	.08, .11*
6062	5110	.505	.20	29,000	79,600	9.0	9.5	Granular, dull spot at the circumference	.07, .11*

CAST IRON

FOR

GUN AND MORTAR CARRIAGES.

Top Carriage.

No. 5987.

Marks, T C 103.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00018	.00006	.....	.....	
5,000	5,000	.00024	.00006	.....	.....	
6,000	6,000	.00030	.00006	.....	.....	
7,000	7,000	.00038	.00008	.....	.....	
8,000	8,000	.00045	.00007	.....	.....	
9,000	9,000	.00052	.00007	.....	.....	
10,000	10,000	.00059	.00007	.00006	.00006	
11,000	11,000	.00068	.00009	.....	.....	
12,000	12,000	.00077	.00009	.....	.....	
13,000	13,000	.00088	.00011	.....	.....	
14,000	14,000	.00097	.00009	.....	.....	
15,000	15,000	.00107	.00010	.....	.....	
16,000	16,000	.00118	.00011	.....	.....	
17,000	17,000	.00130	.00012	.....	.....	
18,000	18,000	.00145	.00015	.....	.....	
19,000	19,000	.00160	.00015	.....	.....	
20,000	20,000	.00178	.00018	.....	.....	
21,000	21,000	.00196	.00018	.....	.....	
22,000	22,000	.00219	.00023	.....	.....	
23,000	23,000	.00246	.00027	.....	.....	
24,000	24,000	.00277	.00031	.....	.....	
25,000	25,000	.00315	.00038	.....	.....	
31,160	31,160	.....	.....	.....	.....	Tensile strength.

Fractured ".8 from neck. Appearance, fine granular, gray.

Top Carriage.

No. 6049.

Marks, T C 104.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00022	.00006	.....	.....	
6,000	6,000	.00029	.00007	.....	.....	
7,000	7,000	.00035	.00006	.....	.....	
8,000	8,000	.00042	.00007	.....	.....	
9,000	9,000	.00050	.00008	.....	.....	
10,000	10,000	.00058	.00008	.00001	.00001	
11,000	11,000	.00067	.00009	.....	.....	
12,000	12,000	.00073	.00006	.....	.....	
13,000	13,000	.00082	.00009	.....	.....	
14,000	14,000	.00092	.00010	.....	.....	
15,000	15,000	.00101	.00009	.00009	.00008	
16,000	16,000	.00111	.00010	.....	.....	
17,000	17,000	.00120	.00009	.....	.....	
18,000	18,000	.00130	.00010	.....	.....	
19,000	19,000	.00143	.00013	.....	.....	
20,000	20,000	.00155	.00012	.00025	.00016	
21,000	21,000	.00172	.00017	.....	.....	
22,000	22,000	.00188	.00016	.....	.....	
23,000	23,000	.00207	.00019	.....	.....	
24,000	24,000	.00226	.00019	.....	.....	
25,000	25,000	.00252	.00026	.00076	.00051	
32,220	32,220	.....	.....	.....	.....	Tensile strength.

Fractured 3″.5 from neck. Appearance, granular, light gray, mottled.

No. 6071.

Marks, 109.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00019	.00007	.....	.....	
5,000	5,000	.00026	.00007	.....	.....	
6,000	6,000	.00031	.00005	.....	.....	
7,000	7,000	.00039	.00008	.....	.....	
8,000	8,000	.00047	.00008	.....	.....	
9,000	9,000	.00052	.00005	.....	.....	
10,000	10,000	.00060	.00008	.00002	.00002	
11,000	11,000	.00069	.00009	.....	.....	
12,000	12,000	.00078	.00009	.....	.....	
13,000	13,000	.00086	.00008	.....	.....	
14,000	14,000	.00094	.00008	.00010	.00008	
15,000	15,000	.00104	.00010	.....	.....	
16,000	16,000	.00113	.00009	.....	.....	
17,000	17,000	.00127	.00014	.....	.....	
18,000	18,000	.00139	.00012	.....	.....	
19,000	19,000	.00151	.00012	.....	.....	
20,000	20,000	.00169	.00018	.00031	.00021	
21,000	21,000	.00183	.00014	.....	.....	
22,000	22,000	.00204	.00021	.....	.....	
23,000	23,000	.00229	.00025	.....	.....	
24,000	24,000	.00253	.00024	.....	.....	
25,000	25,000	.00289	.00032	.00104	.00073	
31,550	31,550	.....	.....	.....	.....	Tensile strength.

Fractured 1″.1 from neck. Appearance, granular, gray.

Top Carriage.

No. 6083.

Marks, T C 111.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00021	.00006	.....	.....	
6,000	6,000	.00026	.00005	.....	.....	
7,000	7,000	.00032	.00006	.....	.....	
8,000	8,000	.00038	.00006	.....	.....	
9,000	9,000	.00044	.00006	.....	.....	
10,000	10,000	.00051	.00007	.00001	.00001	
11,000	11,000	.00059	.00008	.....	.....	
12,000	12,000	.00068	.00009	.....	.....	
13,000	13,000	.00076	.00008	.....	.....	
14,000	14,000	.00083	.00007	.....	.....	
15,000	15,000	.00091	.00008	.00008	.00007	
16,000	16,000	.00102	.00011	.....	.....	
17,000	17,000	.00111	.00009	.....	.....	
18,000	18,000	.00121	.00010	.....	.....	
19,000	19,000	.00133	.00012	.....	.....	
20,000	20,000	.00145	.00012	.00022	.00014	
21,000	21,000	.00159	.00014	.....	.....	
22,000	22,000	.00178	.00019	.....	.....	
22,400	22,400	.....	.....	.....	.....	Tensile strength.

Fractured 1″ from neck. Appearance, granular, gray. A smooth, lustrous spot of metal ″.55 x ″.20 across fractured surface.

Top Carriage.

No. 6129.

Marks, T C 117.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00016	.00009	.....	.....	
4,000	4,000	.00021	.00005	.....	.....	
5,000	5,000	.00027	.00006	.....	.....	
6,000	6,000	.00032	.00005	.....	.....	
7,000	7,000	.00039	.00007	.....	.....	
8,000	8,000	.00046	.00007	.....	.....	
9,000	9,000	.00050	.00004	.....	.....	
10,000	10,000	.00058	.00008	.00006	.00006	
11,000	11,000	.00066	.00008	.....	.....	
12,000	12,000	.00072	.00006	.....	.....	
13,000	13,000	.00079	.00007	.....	.....	
14,000	14,000	.00088	.00009	.....	.....	
15,000	15,000	.00097	.00009	.00009	.00003	
16,000	16,000	.00104	.00007	.....	.....	
17,000	17,000	.00112	.00008	.....	.....	
18,000	18,000	.00121	.00009	.....	.....	
19,000	19,000	.00130	.00009	.....	.....	
20,000	20,000	.00140	.00010	.00018	.00009	
21,000	21,000	.00153	.00013	.....	.....	
22,000	22,000	.00166	.00013	.....	.....	
23,000	23,000	.00178	.00012	.....	.....	
24,000	24,000	.00193	.00015	.....	.....	
25,000	25,000	.00206	.00013	.....	.....	
26,000	26,000	.00224	.00018	.....	.....	
27,000	27,000	.00250	.00026	.00061	.00043	
29,980	29,980	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

Top Carriage.

No. 6140.

Marks, T C 120.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	.....	.....	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00032	.00006	.....	.....	
8,000	8,000	.00040	.00008	.....	.....	
9,000	9,000	.00047	.00007	.....	.....	
10,000	10,000	.00054	.00007	.00001	.00001	
11,000	11,000	.00061	.00007	.....	.....	
12,000	12,000	.00070	.00009	.....	.....	
13,000	13,000	.00078	.00008	.....	.....	
14,000	14,000	.00085	.00007	.....	.....	
15,000	15,000	.00093	.00008	.00007	.00006	
16,000	16,000	.00102	.00009	.....	.....	
17,000	17,000	.00113	.00011	.....	.....	
18,000	18,000	.00121	.00008	.....	.....	
19,000	19,000	.00132	.00011	.....	.....	
20,000	20,000	.00143	.00011	.00018	.00011	
21,000	21,000	.00157	.00014	.....	.....	
22,000	22,000	.00171	.00014	.....	.....	
23,000	23,000	.00189	.00018	.....	.....	
24,000	24,000	.00200	.00011	.....	.....	
25,000	25,000	.00220	.00020	.....	.....	
26,000	26,000	.00243	.00023	.....	.....	
27,000	27,000	.00271	.00028	.00078	.00060	
28,750	28,750	.....	.....	.....	.....	Tensile strength.

Fractured ″.25 from neck. Appearance, fine granular, gray.

Top Carriage.

No. 6161.

Marks, T C 123.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00019	.00007	.....	.....	
5,000	5,000	.00024	.00005	.....	.....	
6,000	6,000	.00030	.00006	.....	.....	
7,000	7,000	.00037	.00007	.....	.....	
8,000	8,000	.00044	.00007	.....	.....	
9,000	9,000	.00051	.00007	.....	.....	
10,000	10,000	.00060	.00009	0.	.....	
11,000	11,000	.00067	.00007	.....	.....	
12,000	12,000	.00074	.00007	.....	.....	
13,000	13,000	.00082	.00008	.....	.....	
14,000	14,000	.00092	.00010	.....	.....	
15,000	15,000	.00101	.00009	.00010	.00010	
16,000	16,000	.00111	.00010	.....	.....	
17,000	17,000	.00121	.00010	.....	.....	
18,000	18,000	.00132	.00011	.....	.....	
19,000	19,000	.00143	.00011	.....	.....	
20,000	20,000	.00155	.00012	.00024	.00014	
21,000	21,000	.00171	.00016	.....	.....	
22,000	22,000	.00186	.00015	.....	.....	
23,000	23,000	.00204	.00018	.....	.....	
24,000	24,000	.00221	.00017	.....	.....	
25,000	25,000	.00241	.00020	.....	.....	
26,000	26,000	.00268	.00027	.00080	.00056	
30,520	30,520	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

Top Carriage.

No. 6164.

Marks, T C 124.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00005	.....	.....	
3,000	3,000	.00011	.00006	.....	.....	
4,000	4,000	.00019	.00008	.....	.....	
5,000	5,000	.00022	.00003	.....	.....	
6,000	6,000	.00030	.00008	.....	.....	
7,000	7,000	.00037	.00007	.....	.....	
8,000	8,000	.00043	.00006	.....	.....	
9,000	9,000	.00050	.00007	.....	.....	
10,000	10,000	.00058	.00008	.00003	.00003	
11,000	11,000	.00066	.00008	.....	.....	
12,000	12,000	.00073	.00007	.....	.....	
13,000	13,000	.00082	.00009	.....	.....	
14,000	14,000	.00090	.00008	.....	.....	
15,000	15,000	.00100	.00010	.00010	.00007	
16,000	16,000	.00110	.00010	.....	.....	
17,000	17,000	.00120	.00010	.....	.....	
18,000	18,000	.00131	.00011	.....	.....	
19,000	19,000	.00142	.00011	.....	.....	
20,000	20,000	.00156	.00014	.00027	.00017	
21,000	21,000	.00170	.00014	.....	.....	
22,000	22,000	.00187	.00017	.....	.....	
23,000	23,000	.00205	.00018	.....	.....	
24,000	24,000	.00228	.00023	.....	.....	
25,000	25,000	.00254	.00026	.....	.....	
29,550	29,550	.....	.....	.....	.....	Tensile strength.

Fractured 1″ from neck. Appearance, fine granular, light gray.

Top Carriage.

No. 6165.

Marks, T C 125.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00020	.00008	.....	.....	
5,000	5,000	.00026	.00006	.....	.....	
6,000	6,000	.00032	.00006	.....	.....	
7,000	7,000	.00040	.00008	.....	.....	
8,000	8,000	.00048	.00008	.....	.....	
9,000	9,000	.00054	.00006	.....	.....	
10,000	10,000	.00063	.00009	.00004	.00004	
11,000	11,000	.00071	.00008	.....	.....	
12,000	12,000	.00080	.00009	.....	.....	
13,000	13,000	.00090	.00010	.....	.....	
14,000	14,000	.00100	.00010	.....	.....	
15,000	15,000	.00110	.00010	.00013	.00009	
16,000	16,000	.00123	.00013	.....	.....	
17,000	17,000	.00133	.00010	.....	.....	
18,000	18,000	.00147	.00014	.....	.....	
19,000	19,000	.00162	.00015	.....	.....	
20,000	20,000	.00180	.00018	.00038	.00025	
21,000	21,000	.00199	.00019	.....	.....	
22,000	22,000	.00220	.00021	.....	.....	
23,000	23,000	.00248	.00028	.....	.....	
23,220	23,220	.....	.....	.....	.....	Tensile strength.

Fractured 2″.60 from neck. Appearance, fine granular, light gray. Smooth lump at circumference ″.30 x ″.25.

Top Carriage.

No. 6184.

Marks, T C 128.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00012	.00007	.....	.....	
4,000	4,000	.00018	.00006	.....	.....	
5,000	5,000	.00024	.00006	.....	.....	
6,000	6,000	.00031	.00007	.....	.....	
7,000	7,000	.00037	.00006	.....	.....	
8,000	8,000	.00043	.00006	.....	.....	
9,000	9,000	.00051	.00008	.....	.....	
10,000	10,000	.00062	.00011	.00002	.00002	
11,000	11,000	.00069	.00007	.....	.....	
12,000	12,000	.00077	.00008	.....	.....	
13,000	13,000	.00084	.00007	.....	.....	
14,000	14,000	.00094	.00010	.....	.....	
15,000	15,000	.00108	.00009	.00008	.00006	
16,000	16,000	.00114	.00011	.....	.....	
17,000	17,000	.00125	.00011	.....	.....	
18,000	18,000	.00136	.00011	.....	.....	
19,000	19,000	.00151	.00015	.....	.....	
20,000	20,000	.00162	.00011	.00025	.00017	
21,000	21,000	.00180	.00018	.....	.....	
22,000	22,000	.00193	.00013	.....	.....	
23,000	23,000	.00213	.00020	.....	.....	
24,000	24,000	.00233	.00020	.....	.....	
25,000	25,000	.00253	.00020	.00069	.00044	
31,280	31,280	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

Top Carriage.

No. 6185.

Marks, T C 129.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00018	.00006	.....	.....	
5,000	5,000	.00023	.00005	.....	.....	
6,000	6,000	.00028	.00005	.....	.....	
7,000	7,000	.00034	.00006	.....	.....	
8,000	8,000	.00041	.00007	.....	.....	
9,000	9,000	.00048	.00007	.....	.....	
10,000	10,000	.00056	.00008	.00002	.00002	
11,000	11,000	.00062	.00006	.....	.....	
12,000	12,000	.00070	.00008	.....	.....	
13,000	13,000	.00078	.00008	.....	.....	
14,000	14,000	.00087	.00009	.....	.....	
15,000	15,000	.00096	.00009	.00009	.00007	
16,000	16,000	.00103	.00007	.....	.....	
17,000	17,000	.00110	.00007	.....	.....	
18,000	18,000	.00121	.00011	.....	.....	
19,000	19,000	.00134	.00013	.....	.....	
20,000	20,000	.00146	.00012	.00021	.00012	
21,000	21,000	.00158	.00012	.....	.....	
22,000	22,000	.00170	.00012	.....	.....	
23,000	23,000	.00188	.00018	.....	.....	
24,000	24,000	.00204	.00016	.....	.....	
25,000	25,000	.00226	.00022	.....	.....	
26,000	26,000	.00251	.00025	.00075	.00054	
26,320	26,320	.....	.....	.....	.....	Tensile strength.

Fractured 4″.75 from neck. Appearance, granular, gray. Lump of smooth, lustrous metal ″.20 x ″.30 in the fractured surface.

Top Carriage.

No. 6188.

Marks, T C 133.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004			
3,000	3,000	.00011	.00007			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00028	.00006			
7,000	7,000	.00033	.00005			
8,000	8,000	.00040	.00007			
9,000	9,000	.00046	.00006			
10,000	10,000	.00052	.00006	.00001	.00001	
11,000	11,000	.00060	.00008			
12,000	12,000	.00067	.00007			
13,000	13,000	.00074	.00007			
14,000	14,000	.00082	.00008			
15,000	15,000	.00091	.00009	.00008	.00007	
16,000	16,000	.00100	.00009			
17,000	17,000	.00109	.00009			
18,000	18,000	.00117	.00008			
19,000	19,000	.00128	.00011			
20,000	20,000	.00139	.00011	.00021	.00013	
21,000	21,000	.00151	.00012			
22,000	22,000	.00163	.00012			
23,000	23,000	.00180	.00017			
24,000	24,000	.00194	.00014			
25,000	25,000	.00215	.00021			
26,000	26,000	.00232	.00017			
27,000	27,000	.00260	.00028	.00061	.00060	
33,800	33,800					Tensile strength.

Fractured 1″.5 from neck. Appearance, fine granular, light gray.

Top Carriage.

No. 6191.

Marks, T C 136.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00009	.00004	.....	.....	
4,000	4,000	.00015	.00006	.....	.....	
5,000	5,000	.00019	.00004	.....	.....	
6,000	6,000	.00026	.00007	.....	.....	
7,000	7,000	.00033	.00007	.....	.....	
8,000	8,000	.00037	.00004	.....	.....	
9,000	9,000	.00045	.00008	.....	.....	
10,000	10,000	.00051	.00006	0.	.....	
11,000	11,000	.00058	.00007	.....	.....	
12,000	12,000	.00065	.00007	.....	.....	
13,000	13,000	.00074	.00009	.....	.....	
14,000	14,000	.00078	.00004	.....	.....	
15,000	15,000	.00087	.00009	.00003	.00003	
16,000	16,000	.00095	.00008	.....	.....	
17,000	17,000	.00105	.00010	.....	.....	
18,000	18,000	.00113	.00008	.....	.....	
19,000	19,000	.00124	.00011	.....	.....	
20,000	20,000	.00135	.00011	.00015	.00012	
21,000	21,000	.00147	.00012	.....	.....	
22,000	22,000	.00159	.00012	.....	.....	
23,000	23,000	.00173	.00014	.....	.....	
24,000	24,000	.00188	.00015	.....	.....	
25,000	25,000	.00206	.00018	.....	.....	
26,000	26,000	.00226	.00020	.....	.....	
27,000	27,000	.00251	.00025	.00070	.00055	
32,610	32,610	.....	.....	.....	.....	Tensile strength.

Fractured 1″.85 from neck. Appearance, fine granular, light gray.

Top Carriage.

No. 6243.

Marks, T C 140.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00014	.00007	.....	.....	
4,000	4,000	.00019	.00005	.....	.....	
5,000	5,000	.00026	.00007	.....	.....	
6,000	6,000	.00031	.00005	.....	.....	
7,000	7,000	.00039	.00008	.....	.....	
8,000	8,000	.00046	.00007	.....	.....	
9,000	9,000	.00054	.00008	.....	.....	
10,000	10,000	.00061	.00007	.00005	.00005	
11,000	11,000	.00069	.00008	.....	.....	
12,000	12,000	.00078	.00009	.....	.....	
13,000	13,000	.00088	.00010	.....	.....	
14,000	14,000	.00099	.00011	.....	.....	
15,000	15,000	.00110	.00011	.00018	.00013	
16,000	16,000	.00126	.00016	.....	.....	
17,000	17,000	.00139	.00013	.....	.....	
18,000	18,000	.00154	.00015	.....	.....	
19,000	19,000	.00174	.00020	.....	.....	
20,000	20,000	.00198	.00024	.00060	.00042	
21,000	21,000	.00224	.00026	.....	.....	
22,000	22,000	.00264	.00040	.....	.....	
23,000	23,000	.00300	.00036	.....	.....	
24,000	24,000	.00350	.00050	.....	.....	
25,000	25,000	.00422	.00072	.00239	.00179	
27,120	27,120	.....	.....	.....	.....	Tensile strength.

Fractured 1″.4 from neck. Appearance, fine granular, light gray.

Top Carriage.

No. 6250.

Marks, T C 147.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00012	.00006			
4,000	4,000	.00018	.00006			
5,000	5,000	.00023	.00005			
6,000	6,000	.00029	.00006			
7,000	7,000	.00034	.00005			
8,000	8,000	.00041	.00007			
9,000	9,000	.00049	.00008			
10,000	10,000	.00057	.00008	.00004	.00004	
11,000	11,000	.00064	.00007			
12,000	12,000	.00070	.00006			
13,000	13,000	.00079	.00009			
14,000	14,000	.00088	.00009			
15,000	15,000	.00098	.00010	.00008	.00004	
16,000	16,000	.00108	.00010			
17,000	17,000	.00118	.00010			
18,000	18,000	.00128	.00010			
19,000	19,000	.00139	.00011			
20,000	20,000	.00154	.00015	.00027	.00019	
21,000	21,000	.00169	.00015			
22,000	22,000	.00185	.00016			
23,000	23,000	.00204	.00019			
24,000	24,000	.00223	.00019			
25,000	25,000	.00248	.00025			
26,000	26,000	.00275	.00027	.00092	.00065	
31,110	31,110					Tensile strength.

Fractured ″.5 from neck. Appearance, fine granular, light gray.

Top Carriage.

No. 6328.

Marks, T C 163.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00021	.00006	.....	.....	
6,000	6,000	.00027	.00006	.....	.....	
7,000	7,000	.00032	.00005	.....	.....	
8,000	8,000	.00040	.00008	.....	.....	
9,000	9,000	.00047	.00007	.....	.....	
10,000	10,000	.00054	.00007	.00001	.00001	
11,000	11,000	.00062	.00008	.....	.....	
12,000	12,000	.00071	.00009	.....	.....	
13,000	13,000	.00080	.00009	.....	.....	
14,000	14,000	.00089	.00009	.....	.....	
15,000	15,000	.00099	.00010	.00008	.00007	
16,000	16,000	.00109	.00010	.....	.....	
17,000	17,000	.00120	.00011	.....	.....	
18,000	18,000	.00131	.00011	.....	.....	
19,000	19,000	.00142	.00011	.....	.....	
20,000	20,000	.00158	.00016	.00022	.00014	
21,000	21,000	.00171	.00013	.....	.....	
22,000	22,000	.00189	.00018	.....	.....	
23,000	23,000	.00207	.00018	.....	.....	
24,000	24,000	.00230	.00023	.....	.....	
25,000	25,000	.00251	.00021	.00075	.00053	
30,470	30,470	.....	.....	.....	.....	Tensile strength.

Fractured 1″ from neck. Appearance fine granular, light gray.

Top Carriage.

No. 6440.

Marks, T C 171.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00021	.00009	.....	.....	
5,000	5,000	.00030	.00009	.....	.....	
6,000	6,000	.00039	.00009	.....	.....	
7,000	7,000	.00049	.00010	.....	.....	
8,000	8,000	.00059	.00010	.....	.....	
9,000	9,000	.00069	.00010	.....	.....	
10,000	10,000	.00080	.00011	.00008	.00008	
11,000	11,000	.00094	.00014	.....	.....	
12,000	12,000	.00107	.00013	.....	.....	
13,000	13,000	.00120	.00013	.....	.....	
14,000	14,000	.00138	.00018	.....	.....	
15,000	15,000	.00157	.00019	.00029	.00021	
16,000	16,000	.00179	.00022	.....	.....	
17,000	17,000	.00209	.00030	.....	.....	
18,000	18,000	.00239	.00030	.....	.....	
18,300	18,300	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance fine granular, dark gray.

Chassis Rail.

No. 6187.

Marks, C R 132.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00009	.00003	.....	.....	
4,000	4,000	.00015	.00006	.....	.....	
5,000	5,000	.00023	.00008	.....	.....	
6,000	6,000	.00028	.00005	.....	.....	
7,000	7,000	.00033	.00005	.....	.....	
8,000	8,000	.00040	.00007	.....	.....	
9,000	9,000	.00046	.00006	.....	.....	
10,000	10,000	.00051	.00005	.00002	.00002	
11,000	11,000	.00058	.00007	.....	.....	
12,000	12,000	.00065	.00007	.....	.....	
13,000	13,000	.00071	.00006	.....	.....	
14,000	14,000	.00078	.00007	.....	.....	
15,000	15,000	.00086	.00008	.00007	.00005	
16,000	16,000	.00093	.00007	.....	.....	
17,000	17,000	.00101	.00008	.....	.....	
18,000	18,000	.00110	.00009	.....	.....	
19,000	19,000	.00119	.00009	.....	.....	
20,000	20,000	.00128	.00009	.00014	.00007	
21,000	21,000	.00138	.00010	.....	.....	
22,000	22,000	.00149	.00011	.....	.....	
23,000	23,000	.00160	.00011	.....	.....	
24,000	24,000	.00170	.00010	.....	.....	
25,000	25,000	.00182	.00012	.....	.....	
26,000	26,000	.00200	.00018	.....	.....	
27,000	27,000	.00218	.00018	.....	.....	
28,000	28,000	.00233	.00015	.....	.....	
29,000	29,000	.00252	.00019	.00072	.00058	
34,760	34,760	.....	.....	.....	.....	Tensile strength.

Fractured 1".2 from neck. Appearance fine, granular, light gray, mottled.

Base Ring.

No. 6084.

Marks, B R 112.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00012	.00007	.....	.....	
4,000	4,000	.00017	.00005	.....	.....	
5,000	5,000	.00023	.00006	.....	.....	
6,000	6,000	.00030	.00007	.....	.....	
7,000	7,000	.00036	.00006	.....	.....	
8,000	8,000	.00041	.00005	.....	.....	
9,000	9,000	.00050	.00009	.....	.....	
10,000	10,000	.00057	.00007	.00002	.00002	
11,000	11,000	.00063	.00006	.....	.....	
12,000	12,000	.00071	.00008	.....	.....	
13,000	13,000	.00079	.00008	.....	.....	
14,000	14,000	.00087	.00008	.....	.....	
15,000	15,000	.00096	.00009	.00008	.00006	
16,000	16,000	.00103	.00007	.....	.....	
17,000	17,000	.00112	.00009	.....	.....	
18,000	18,000	.00122	.00010	.....	.....	
19,000	19,000	.00134	.00012	.....	.....	
20,000	20,000	.00145	.00011	.00019	.00011	
21,000	21,000	.00158	.00013	.....	.....	
22,000	22,000	.00172	.00014	.....	.....	
23,000	23,000	.00183	.00011	.....	.....	
24,000	24,000	.00200	.00017	.....	.....	
25,000	25,000	.00220	.00020	.....	.....	
26,000	26,000	.00236	.00016	.....	.....	
27,000	27,000	.00258	.00022	.00071	.00052	
32,280	32,280	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

Base Ring.

No. 6107.

Marks, B R 114.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00019	.00007	.....	.....	
5,000	5,000	.00025	.00006	.....	.....	
6,000	6,000	.00032	.00007	.....	.....	
7,000	7,000	.00038	.00006	.....	.....	
8,000	8,000	.00043	.00005	.....	.....	
9,000	9,000	.00051	.00008	.....	.....	
10,000	10,000	.00060	.00009	.00001	.00001	
11,000	11,000	.00066	.00006	.....	.....	
12,000	12,000	.00073	.00007	.....	.....	
13,000	13,000	.00080	.00007	.....	.....	
14,000	14,000	.00090	.00010	.....	.....	
15,000	15,000	.00100	.00010	.00008	.00007	
16,000	16,000	.00108	.00008	.....	.....	
17,000	17,000	.00118	.00010	.....	.....	
18,000	18,000	.00128	.00010	.....	.....	
19,000	19,000	.00140	.00012	.....	.....	
20,000	20,000	.00152	.00012	.00021	.00013	
21,000	21,000	.00166	.00014	.....	.....	
22,000	22,000	.00181	.00015	.....	.....	
23,000	23,000	.00201	.00020	.....	.....	
24,000	24,000	.00219	.00018	.....	.....	
25,000	25,000	.00241	.00022	.....	.....	
26,000	26,000	.00263	.00022	.00077	.00056	
31,900	31,900	.....	.....	.....	.....	Tensile strength.

Fractured ".9 from neck. Appearance, fine granular, gray.

Base Ring.

No. 6128.

Marks, B R 116.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00011	.00006			
4,000	4,000	.00019	.00008			
5,000	5,000	.00022	.00003			
6,000	6,000	.00030	.00008			
7,000	7,000	.00036	.00006			
8,000	8,000	.00043	.00007			
9,000	9,000	.00050	.00007			
10,000	10,000	.00059	.00009	.00002	.00002	
11,000	11,000	.00067	.00008			
12,000	12,000	.00077	.00010			
13,000	13,000	.00086	.00009			
14,000	14,000	.00094	.00008			
15,000	15,000	.00104	.00010	.00012	.00010	
16,000	16,000	.00114	.00010			
17,000	17,000	.00129	.00015			
18,000	18,000	.00140	.00011			
19,000	19,000	.00152	.00012			
20,000	20,000	.00171	.00019	.00032	.00020	
21,000	21,000	.00188	.00017			
22,000	22,000	.00211	.00023			
23,000	23,000	.00238	.00027			
24,000	24,000	.00270	.00032			
25,000	25,000	.00304	.00034	.00113	.00081	
25,800	25,800					Tensile strength.

Fractured ″.7 from neck. Appearance, fine granular, light gray.

Base Ring.

No. 6139.

Marks, B R 119.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00012	.00006			
4,000	4,000	.00018	.00006			
5,000	5,000	.00025	.00007			
6,000	6,000	.00030	.00005			
7,000	7,000	.00037	.00007			
8,000	8,000	.00044	.00007			
9,000	9,000	.00050	.00006			
10,000	10,000	.00058	.00008	.00001	.00001	
11,000	11,000	.00067	.00009			
12,000	12,000	.00075	.00008			
13,000	13,000	.00082	.00007			
14,000	14,000	.00091	.00009			
15,000	15,000	.00100	.00009	.00008	.00007	
16,000	16,000	.00110	.00010			
17,000	17,000	.00120	.00010			
18,000	18,000	.00131	.00011			
19,000	19,000	.00143	.00012			
20,000	20,000	.00154	.00011	.00020	.00012	
21,000	21,000	.00168	.00014			
22,000	22,000	.00180	.00012			
23,000	23,000	.00199	.00019			
24,000	24,000	.00217	.00018			
25,000	25,000	.00238	.00021			
26,000	26,000	.00261	.00023	.00067	.00047	
28,900	28,900					Tensile strength.

Fractured 1".75 from neck. Appearance, fine granular, light gray.

Base Ring.

No. 6152.

Marks, B R 122.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00011	.00006	.....	.....	
4,000	4,000	.00018	.00007	.....	.....	
5,000	5,000	.00024	.00006	.....	.....	
6,000	6,000	.00029	.00005	.....	.....	
7,000	7,000	.00035	.00006	.....	.....	
8,000	8,000	.00041	.00006	.....	.....	
9,000	9,000	.00048	.00007	.....	.....	
10,000	10,000	.00056	.00008	.00001	.00001	
11,000	11,000	.00062	.00006	.....	.....	
12,000	12,000	.00070	.00008	.....	.....	
13,000	13,000	.00079	.00009	.....	.....	
14,000	14,000	.00088	.00009	.....	.....	
15,000	15,000	.00097	.00009	.00008	.00007	
16,000	16,000	.00105	.00008	.....	.....	
17,000	17,000	.00116	.00011	.....	.....	
18,000	18,000	.00125	.00009	.....	.....	
19,000	19,000	.00136	.00011	.....	.....	
20,000	20,000	.00149	.00013	.00020	.00012	
21,000	21,000	.00162	.00013	.....	.....	
22,000	22,000	.00177	.00015	.....	.....	
23,000	23,000	.00192	.00015	.....	.....	
24,000	24,000	.00210	.00018	.....	.....	
25,000	25,000	.00230	.00020	.....	.....	
26,000	26,000	.00252	.00022	.00069	.00049	
29,210	29,210	.....	.....	.....	.....	Tensile strength.

Fractured 1″ from neck. Appearance, fine granular, light gray, 80 per cent; dark gray on one side, 20 per cent.

Base Ring.

No. 6167.

Marks, B R 127.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00021	.00005	.....	.....	
6,000	6,000	.00028	.00007	.....	.....	
7,000	7,000	.00033	.00005	.....	.....	
8,000	8,000	.00040	.00007	.....	.....	
9,000	9,000	.00048	.00008	.....	.....	
10,000	10,000	.00053	.00005	.00002	.00002	
11,000	11,000	.00063	.00010	.....	.....	
12,000	12,000	.00070	.00007	.....	.....	
13,000	13,000	.00076	.00006	.....	.....	
14,000	14,000	.00084	.00008	.....	.....	
15,000	15,000	.00098	.00009	.00008	.00006	
16,000	16,000	.00104	.00011	.....	.....	
17,000	17,000	.00113	.00009	.....	.....	
18,000	18,000	.00123	.00010	.....	.....	
19,000	19,000	.00134	.00011	.....	.....	
20,000	20,000	.00148	.00014	.00022	.00014	
21,000	21,000	.00160	.00012	.....	.....	
22,000	22,000	.00175	.00015	.....	.....	
23,000	23,000	.00190	.00015	.....	.....	
24,000	24,000	.00210	.00020	.....	.....	
25,000	25,000	.00230	.00020	.....	.....	
26,000	26,000	.00258	.00028	.00078	.00061	
31,690	31,690	.....	.....	.....	.....	Tensile strength.

Fractured ″.60 from neck. Appearance, fine granular, light gray.

Base Ring.

No. 6186.

Marks, B R 131.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004			
3,000	3,000	.00011	.00007			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00029	.00007			
7,000	7,000	.00033	.00004			
8,000	8,000	.00040	.00007			
9,000	9,000	.00046	.00006			
10,000	10,000	.00053	.00007	.00002	.00002	
11,000	11,000	.00061	.00008			
12,000	12,000	.00068	.00007			
13,000	13,000	.00075	.00007			
14,000	14,000	.00082	.00007			
15,000	15,000	.00091	.00009	.00010	.00008	
16,000	16,000	.00101	.00010			
17,000	17,000	.00111	.00010			
18,000	18,000	.00121	.00010			
19,000	19,000	.00131	.00010			
20,000	20,000	.00142	.00011	.00024	.00014	
21,000	21,000	.00155	.00013			
22,000	22,000	.00170	.00015			
23,000	23,000	.00183	.00013			
24,000	24,000	.00202	.00019			
25,000	25,000	.00222	.00020			
26,000	26,000	.00243	.00021			
27,000	27,000	.00267	.00024	.00091	.00067	
34,020	34,020					Tensile strength.

Fractured 1″.5 from neck. Appearance, fine granular, light gray.

BASE RING.

No. 6217.

Marks, B R 139.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00019	.00007	.....	.....	
5,000	5,000	.00025	.00006	.....	.....	
6,000	6,000	.00031	.00006	.....	.....	
7,000	7,000	.00040	.00009	.....	.....	
8,000	8,000	.00048	.00008	.....	.....	
9,000	9,000	.00055	.00007	.....	.....	
10,000	10,000	.00062	.00007	.00005	.00005	
11,000	11,000	.00071	.00009	.....	.....	
12,000	12,000	.00081	.00010	.....	.....	
13,000	13,000	.00091	.00010	.....	.....	
14,000	14,000	.00102	.00011	.....	.....	
15,000	15,000	.00115	.00013	.00021	.00016	
16,000	16,000	.00129	.00014	.....	.....	
17,000	17,000	.00146	.00017	.....	.....	
18,000	18,000	.00163	.00017	.....	.....	
19,000	19,000	.00190	.00027	.....	.....	
20,000	20,000	.00218	.00028	.00077	.00056	
21,000	21,000	.00259	.00041	.....	.....	
22,000	22,000	.00293	.00034	.....	.....	
23,000	23,000	.00350	.00057	.00185	.00108	
27,290	27,290	.....	.....	.....	.....	Tensile strength.

Fractured 1".3 from neck. Appearance, granular, dark gray.

Base Ring.

No. 6248.

Marks, B R 145.
Diameter, 1".129.
Sectional area, 1.00 square inch
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00011	.00006	.....	.....	
4,000	4,000	.00017	.00006	.....	.....	
5,000	5,000	.00022	.00005	.....	.....	
6,000	6,000	.00028	.00006	.....	.....	
7,000	7,000	.00034	.00006	.....	.....	
8,000	8,000	.00041	.00007	.....	.....	
9,000	9,000	.00048	.00007	.....	.....	
10,000	10,000	.00054	.00006	.00001	.00001	
11,000	11,000	.00062	.00008	.....	.....	
12,000	12,000	.00071	.00009	.....	.....	
13,000	13,000	.00079	.00008	.....	.....	
14,000	14,000	.00088	.00009	.....	.....	
15,000	15,000	.00097	.00009	.00009	.00008	
16,000	16,000	.00106	.00009	.....	.....	
17,000	17,000	.00116	.00010	.....	.....	
18,000	18,000	.00127	.00011	.....	.....	
19,000	19,000	.00139	.00012	.....	.....	
20,000	20,000	.00152	.00013	.00024	.00015	
21,000	21,000	.00168	.00016	.....	.....	
22,000	22,000	.00182	.00014	.....	.....	
23,000	23,000	.00201	.00019	.....	.....	
24,000	24,000	.00221	.00020	.....	.....	
25,000	25,000	.00243	.00022	.....	.....	
26,000	26,000	.00270	.00027	.00068	.00064	
31,040	31,040	.....	.....	.....	.....	Tensile strength.

Fractured ".5 from neck. Appearance, fine granular, light gray.

Base Ring.

No. 6267.

Marks, B R 150.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00018	.00007	.....	.....	
5,000	5,000	.00024	.00006	.....	.....	
6,000	6,000	.00030	.00006	.....	.....	
7,000	7,000	.00038	.00008	.....	.....	
8,000	8,000	.00043	.00005	.....	.....	
9,000	9,000	.00051	.00008	.....	.....	
10,000	10,000	.00059	.00008	.00001	.00001	
11,000	11,000	.00067	.00008	.....	.....	
12,000	12,000	.00075	.00008	.....	.....	
13,000	13,000	.00083	.00008	.....	.....	
14,000	14,000	.00091	.00008	.....	.....	
15,000	15,000	.00100	.00009	.00010	.00009	
16,000	16,000	.00110	.00010	.....	.....	
17,000	17,000	.00121	.00011	.....	.....	
18,000	18,000	.00131	.00010	.....	.....	
19,000	19,000	.00146	.00015	.....	.....	
20,000	20,000	.00159	.00013	.00027	.00017	
21,000	21,000	.00172	.00013	.....	.....	
22,000	22,000	.00189	.00017	.....	.....	
23,000	23,000	.00206	.00017	.....	.....	
24,000	24,000	.00228	.00022	.....	.....	
25,000	25,000	.00250	.00022	.00072	.00045	
30,020	30,020	.....	.....	.....	.....	Tensile strength.

Fractured 1″.45 *from* neck. Appearance, fine granular, light gray, mottled.

Base Ring.

No. 6286.

Marks, B R 154.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	.....	.....	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00038	.00007	.....	.....	
9,000	9,000	.00044	.00006	.....	.....	
10,000	10,000	.00051	.00007	.00001	.00001	
11,000	11,000	.00058	.00007	.....	.....	
12,000	12,000	.00065	.00007	.....	.....	
13,000	13,000	.00071	.00006	.....	.....	
14,000	14,000	.00080	.00009	.....	.....	
15,000	15,000	.00088	.00008	.00007	.00006	
16,000	16,000	.00097	.00009	.....	.....	
17,000	17,000	.00105	.00008	.....	.....	
18,000	18,000	.00114	.00009	.....	.....	
19,000	19,000	.00124	.00010	.....	.....	
20,000	20,000	.00133	.00009	.00018	.00011	
21,000	21,000	.00145	.00012	.....	.....	
22,000	22,000	.00158	.00013	.....	.....	
23,000	23,000	.00171	.00013	.....	.....	
24,000	24,000	.00187	.00016	.....	.....	
25,000	25,000	.00202	.00015	.....	.....	
26,000	26,000	.00222	.00020	.....	.....	
27,000	27,000	.00241	.00019	.....	.....	
28,000	28,000	.00271	.00030	.00084	.00066	
28,900	28,900	.....	.....	.....	.....	Tensile strength.

Fractured 2″.5 from neck. Appearance, fine granular, light gray. Smooth lustrous spot ″.10 by ″.35 in fractured surface.

Base Ring.

No. 6303.

Marks, B R 157.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00017	.00006	.....	.....	
5,000	5,000	.00022	.00005	.....	.....	
6,000	6,000	.00029	.00007	.....	.....	
7,000	7,000	.00035	.00006	.....	.....	
8,000	8,000	.00041	.00006	.....	.....	
9,000	9,000	.00049	.00008	.....	.....	
10,000	10,000	.00056	.00006	.00001	.00001	
11,000	11,000	.00063	.00008	.....	.....	
12,000	12,000	.00070	.00007	.....	.....	
13,000	13,000	.00079	.00009	.....	.....	
14,000	14,000	.00087	.00008	.....	.....	
15,000	15,000	.00096	.00009	.00008	.00007	
16,000	16,000	.00105	.00009	.....	.....	
17,000	17,000	.00116	.00011	.....	.....	
18,000	18,000	.00127	.00011	.....	.....	
19,000	19,000	.00140	.00013	.....	.....	
20,000	20,000	.00152	.00012	.00023	.00015	
21,000	21,000	.00170	.00018	.....	.....	
22,000	22,000	.00187	.00017	.....	.....	
23,000	23,000	.00207	.00020	.....	.....	
24,000	24,000	.00225	.00018	.....	.....	
25,000	25,000	.00250	.00025	.00075	.00052	
30,980	30,980	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

Base Ring.

No. 6326.

Marks, B R 161.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	.....	.....	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00036	.00005	.....	.....	
9,000	9,000	.00042	.00006	.....	.....	
10,000	10,000	.00050	.00008	0.	.....	
11,000	11,000	.00056	.00006	.....	.....	
12,000	12,000	.00063	.00007	.....	.....	
13,000	13,000	.00071	.00008	.....	.....	
14,000	14,000	.00079	.00008	.....	.....	
15,000	15,000	.00088	.00009	.00005	.00005	
16,000	16,000	.00097	.00009	.....	.....	
17,000	17,000	.00106	.00009	.....	.....	
18,000	18,000	.00116	.00010	.....	.....	
19,000	19,000	.00125	.00009	.....	.....	
20,000	20,000	.00137	.00012	.00018	.00013	
21,000	21,000	.00149	.00012	.....	.....	
22,000	22,000	.00162	.00013	.....	.....	
23,000	23,000	.00174	.00012	.....	.....	
24,000	24,000	.00190	.00016	.....	.....	
25,000	25,000	.00210	.00020	.....	.....	
26,000	26,000	.00230	.00020	.....	.....	
27,000	27,000	.00252	.00022	.00076	.00058	
33,560	33,560	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray, mottled.

Base Ring.

No. 6329.

Marks, B R 164.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00030	.00008			
7,000	7,000	.00037	.00007			
8,000	8,000	.00043	.00006			
9,000	9,000	.00050	.00007			
10,000	10,000	.00059	.00009	.00002	.00002	
11,000	11,000	.00066	.00007			
12,000	12,000	.00074	.00008			
13,000	13,000	.00082	.00008			
14,000	14,000	.00091	.00009			
15,000	15,000	.00100	.00009	.00009	.00007	
16,000	16,000	.00110	.00010			
17,000	17,000	.00121	.00011			
18,000	18,000	.00131	.00010			
19,000	19,000	.00142	.00011			
20,000	20,000	.00155	.00013	.00022	.00013	
21,000	21,000	.00169	.00014			
22,000	22,000	.00182	.00013			
23,000	23,000	.00200	.00018			
24,000	24,000	.00218	.00018			
25,000	25,000	.00238	.00020			
26,000	26,000	.00259	.00021	.00071	.00049	
33,700	33,700					Tensile strength.

Fractured 2″.1 from neck. Appearance, fine granular, light gray, darker section on one side.

Base Ring.

No. 6332.

Marks, B R 167.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00018	.00006	.....	.....	
5,000	5,000	.00025	.00007	.....	.....	
6,000	6,000	.00030	.00005	.....	.....	
7,000	7,000	.00037	.00007	.....	.....	
8,000	8,000	.00045	.00008	.....	.....	
9,000	9,000	.00051	.00006	.....	.....	
10,000	10,000	.00059	.00008	.00006	.00006	
11,000	11,000	.00066	.00007	.....	.....	
12,000	12,000	.00074	.00008	.....	.....	
13,000	13,000	.00082	.00008	.....	.....	
14,000	14,000	.00092	.00010	.....	.....	
15,000	15,000	.00103	.00011	.00018	.00012	
16,000	16,000	.00114	.00011	.....	.....	
17,000	17,000	.00129	.00015	.....	.....	
18,000	18,000	.00142	.00013	.....	.....	
19,000	19,000	.00161	.00019	.....	.....	
20,000	20,000	.00182	.00021	.00059	.00041	
21,000	21,000	.00210	.00028	.....	.....	
22,000	22,000	.00250	.00040	.....	.....	
22,300	22,300	.....	.....	.....	.....	Tensile strength.

Fractured 3″.1 from neck. Appearance, fine granular, light gray, 60 per cent; smooth lustrous spot ″.30 x ″.40, surrounded by dark gray metal, 40 per cent.

Base Ring.

No. 6372.

Marks, B R 170.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00009	.00004			
4,000	4,000	.00015	.00006			
5,000	5,000	.00020	.00005			
6,000	6,000	.00027	.00007			
7,000	7,000	.00032	.00005			
8,000	8,000	.00038	.00006			
9,000	9,000	.00045	.00007			
10,000	10,000	.00051	.00006	.00001	.00001	
11,000	11,000	.00060	.00009			
12,000	12,000	.00069	.00009			
13,000	13,000	.00078	.00009			
14,000	14,000	.00087	.00009			
15,000	15,000	.00094	.00007	.00009	.00008	
16,000	16,000	.00104	.00010			
17,000	17,000	.00114	.00010			
18,000	18,000	.00125	.00011			
19,000	19,000	.00136	.00011			
20,000	20,000	.00149	.00013	.00022	.00013	
21,000	21,000	.00161	.00012			
22,000	22,000	.00178	.00017			
23,000	23,000	.00200	.00022			
24,000	24,000	.00220	.00020			
25,000	25,000	.00240	.00020			
26,000	26,000	.00268	.00028	.00068	.00066	
30,880	30,880					Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

Base Ring.

No. 6441.

Marks, B R 172.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00014	.00007	.....	.....	
4,000	4,000	.00020	.00006	.....	.....	
5,000	5,000	.00028	.00008	.....	.....	
6,000	6,000	.00033	.00005	.....	.....	
7,000	7,000	.00040	.00007	.....	.....	
8,000	8,000	.00049	.00009	.....	.....	
9,000	9,000	.00057	.00008	.....	.....	
10,000	10,000	.00065	.00008	.00007	.00007	
11,000	11,000	.00072	.00007	.....	.....	
12,000	12,000	.00080	.00008	.....	.....	
13,000	13,000	.00090	.00010	.....	.....	
14,000	14,000	.00100	.00010	.....	.....	
15,000	15,000	.00110	.00010	.00014	.00007	
16,000	16,000	.00122	.00012	.....	.....	
17,000	17,000	.00133	.00011	.....	.....	
18,000	18,000	.00148	.00015	.....	.....	
19,000	19,000	.00161	.00013	.....	.....	
20,000	20,000	.00179	.00018	.00040	.00026	
21,000	21,000	.00199	.00020	.....	.....	
22,000	22,000	.00221	.00022	.....	.....	
23,000	23,000	.00245	.00024	.....	.....	
24,000	24,000	.00272	.00027	.....	.....	
25,000	25,000	.00816	.00044	.00123	.00083	
30,080	30,080	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, dark gray.

RACER.

No. 6106.

Marks, R 113.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00020	.00008	.....	.....	
5,000	5,000	.00026	.00006	.....	.....	
6,000	6,000	.00032	.00006	.....	.....	
7,000	7,000	.00040	.00008	.....	.....	
8,000	8,000	.00048	.00008	.....	.....	
9,000	9,000	.00055	.00007	.....	.....	
10,000	10,000	.00062	.00007	.00001	.00001	
11,000	11,000	.00070	.00008	.....	.....	
12,000	12,000	.00079	.00009	.....	.....	
13,000	13,000	.00088	.00009	.....	.....	
14,000	14,000	.00098	.00010	.....	.....	
15,000	15,000	.00107	.00009	.00008	.00007	
16,000	16,000	.00115	.00008	.....	.....	
17,000	17,000	.00125	.00010	.....	.....	
18,000	18,000	.00136	.00011	.....	.....	
19,000	19,000	.00149	.00013	.....	.....	
20,000	20,000	.00161	.00012	.00023	.00015	
21,000	21,000	.00175	.00014	.....	.....	
22,000	22,000	.00191	.00016	.....	.....	
23,000	23,000	.00212	.00021	.....	.....	
24,000	24,000	.00230	.00018	.....	.....	
25,000	25,000	.00251	.00021	.00068	.00045	
31,610	31,610	.....	.....	.....	.....	Tensile strength.

Fractured 1″.2 from neck. Appearance, fine granular, gray.

RACER.

No. 6108.

Marks, R 115.
Diameter, 1″.129.
Sectional area, 1.00 square inch
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00029	.00007			
7,000	7,000	.00035	.00006			
8,000	8,000	.00041	.00006			
9,000	9,000	.00047	.00006			
10,000	10,000	.00052	.00005	.00001	.00001	
11,000	11,000	.00060	.00008			
12,000	12,000	.00068	.00008			
13,000	13,000	.00074	.00006			
14,000	14,000	.00081	.00007			
15,000	15,000	.00090	.00009	.00007	.00006	
16,000	16,000	.00099	.00009			
17,000	17,000	.00107	.00008			
18,000	18,000	.00114	.00007			
19,000	19,000	.00123	.00009			
20,000	20,000	.00132	.00009	.00011	.00004	
21,000	21,000	.00144	.00012			
22,000	22,000	.00156	.00012			
23,000	23,000	.00168	.00012			
24,000	24,000	.00180	.00012			
25,000	25,000	.00195	.00015			
26,000	26,000	.00210	.00015			
27,000	27,000	.00230	.00020			
28,000	28,000	.00250	.00020	.00061	.00050	
33,020	33,020					Tensile strength.

Fractured at the neck. Appearance fine granular, gray.

RACER.

No. 6130.

Marks, R 118.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00017	.00007	.....	.....	
5,000	5,000	.00025	.00008	.....	.....	
6,000	6,000	.00032	.00007	.....	.....	
7,000	7,000	.00037	.00005	.....	.....	
8,000	8,000	.00045	.00008	.....	.....	
9,000	9,000	.00051	.00006	.....	.....	
10,000	10,000	.00059	.00008	.00005	.00005	
11,000	11,000	.00068	.00009	.....	.....	
12,000	12,000	.00077	.00009	.....	.....	
13,000	13,000	.00087	.00010	.....	.....	
14,000	14,000	.00096	.00009	.....	.....	
15,000	15,000	.00106	.00010	.00009	.00004	
16,000	16,000	.00116	.00010	.....	.....	
17,000	17,000	.00127	.00011	.....	.....	
18,000	18,000	.00138	.00011	.....	.....	
19,000	19,000	.00155	.00017	.....	.....	
20,000	20,000	.00168	.00013	.00027	.00018	
21,000	21,000	.00184	.00016	.....	.....	
22,000	22,000	.00201	.00017	.....	.....	
23,000	23,000	.00225	.00024	.....	.....	
24,000	24,000	.00247	.00022	.....	.....	
25,000	25,000	.00277	.00030	.00079	.00062	
27,020	27,020	.....	.....	.....	.....	Tensile strength.

Fractured 2″.6 from neck. Appearance fine granular, gray.

RACER.

No. 6150.

Marks, R 121.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00011	.00006			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00030	.00008			
7,000	7,000	.00037	.00007			
8,000	8,000	.00042	.00005			
9,000	9,000	.00051	.00009			
10,000	10,000	.00058	.00007	.00001	.00001	
11,000	11,000	.00065	.00007			
12,000	12,000	.00072	.00007			
13,000	13,000	.00082	.00010			
14,000	14,000	.00091	.00009			
15,000	15,000	.00100	.00009	.00008	.00007	
16,000	16,000	.00111	.00011			
17,000	17,000	.00121	.00010			
18,000	18,000	.00131	.00010			
19,000	19,000	.00143	.00012			
20,000	20,000	.00156	.00013	.00021	.00013	
21,000	21,000	.00172	.00016			
22,000	22,000	.00188	.00016			
23,000	23,000	.00206	.00018			
24,000	24,000	.00222	.00016			
25,000	25,000	.00250	.00028	.00064	.00043	
27,420	27,420	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance fine granular, light gray.

RACER.

No. 6166.

Marks, R 126.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00019	.00007	.....	.....	
5,000	5,000	.00025	.00006	.....	.....	
6,000	6,000	.00031	.00006	.....	.....	
7,000	7,000	.00039	.00008	.....	.....	
8,000	8,000	.00045	.00006	.....	.....	
9,000	9,000	.00052	.00007	.....	.....	
10,000	10,000	.00060	.00008	.00004	.00004	
11,000	11,000	.00067	.00007	.....	.....	
12,000	12,000	.00074	.00007	.....	.....	
13,000	13,000	.00082	.00008	.....	.....	
14,000	14,000	.00090	.00008	.....	.....	
15,000	15,000	.00100	00010	.00010	.00006	
16,000	16,000	.00111	.00011	.....	.....	
17,000	17,000	.00119	.00008	.....	.....	
18,000	18,000	.00129	.00010	.....	.....	
19,000	19,000	.00139	.00010	.....	.....	
20,000	20,000	.00150	.00011	.00023	.00013	
21,000	21,000	.00163	.00013	.....	.....	
22,000	22,000	.00178	.00015	.....	.....	
23,000	23,000	.00192	.00014	.....	.....	
24,000	24,000	.00210	.00018	.....	.....	
25,000	25,000	.00229	.00019	.....	.....	
26,000	26,000	.00250	.00021	.00069	.00046	
31,980	31,980	.....	.....	.....	.....	Tensile strength.

Fractured 1″.50 from neck. Appearance, fine granular, light gray.

RACER.

No. 6190.

Marks, R 134.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00021	.00006	.....	.....	
6,000	6,000	.00026	.00005	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00037	.00006	.....	.....	
9,000	9,000	.00043	.00006	.....	.....	
10,000	10,000	.00050	.00007	.00001	.00001	
11,000	11,000	.00056	.00006	.....	.....	
12,000	12,000	.00062	.00006	.....	.....	
13,000	13,000	.00070	.00008	.....	.....	
14,000	14,000	.00077	.00007	.....	.....	
15,000	15,000	.00083	.00006	.00003	.00002	
16,000	16,000	.00090	.00007	.....	.....	
17,000	17,000	.00099	.00009	.....	.....	
18,000	18,000	.00106	.00007	.....	.....	
19,000	19,000	.00113	.00007	.....	.....	
20,000	20,000	.00121	.00008	.00011	.00008	
21,000	21,000	.00132	.00011	.....	.....	
22,000	22,000	.00141	.00009	.....	.....	
23,000	23,000	.00151	.00010	.....	.....	
24,000	24,000	.00162	.00011	.....	.....	
25,000	25,000	.00176	.00014	.....	.....	
26,000	26,000	.00189	.00013	.....	.....	
27,000	27,000	.00202	.00013	.....	.....	
28,000	28,000	.00220	.00018	.....	.....	
29,000	29,000	.00239	.00019	.....	.....	
30,000	30,000	.00260	.00021	.00071	.00060	
35,280	35,280	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

RACER.

No. 6216.

Marks, R 138.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00010	.00004			
4,000	4,000	.00017	.00007			
5,000	5,000	.00021	.00004			
6,000	6,000	.00028	.00007			
7,000	7,000	.00034	.00006			
8,000	8,000	.00040	.00006			
9,000	9,000	.00047	.00007			
10,000	10,000	.00053	.00006	.00001	.00001	
11,000	11,000	.00060	.00007			
12,000	12,000	.00068	.00008			
13,000	13,000	.00073	.00005			
14,000	14,000	.00081	.00008			
15,000	15,000	.00090	.00009	.00008	.00007	
16,000	16,000	.00098	.00008			
17,000	17,000	.00108	.00010			
18,000	18,000	.00117	.00009			
19,000	19,000	.00127	.00010			
20,000	20,000	.00136	.00009	.00018	.00010	
21,000	21,000	.00149	.00013			
22,000	22,000	.00160	.00011			
23,000	23,000	.00172	.00012			
24,000	24,000	.00189	.00017			
25,000	25,000	.00204	.00015			
26,000	26,000	.00221	.00017			
27,000	27,000	.00248	.00027			
28,000	28,000	.00270	.00022	.00082	.00064	
35,340	35,340					Tensile strength.

Fractured 2″.2 from neck. Appearance, fine granular, light gray.

RACER.

No. 6244.

Marks R 141.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00011	.00006	.....	.....	
4,000	4,000	.00018	.00007	.....	.....	
5,000	5,000	.00023	.00005	.....	.....	
6,000	6,000	.00029	.00006	.....	.....	
7,000	7,000	.00035	.00006	.....	.....	
8,000	8,000	.00041	.00006	.....	.....	
9,000	9,000	.00048	.00007	.....	.....	
10,000	10,000	.00055	.00007	0.	.....	
11,000	11,000	.00061	.00006	.....	.....	
12,000	12,000	.00069	.00008	.....	.....	
13,000	13,000	.00076	.00007	.....	.....	
14,000	14,000	.00082	.00006	.....	.....	
15,000	15,000	.00089	.00007	.00007	.00007	
16,000	16,000	.00098	.00009	.....	.....	
17,000	17,000	.00108	.00010	.....	.....	
18,000	18,000	.00117	.00009	.....	.....	
19,000	19,000	.00127	.00010	.....	.....	
20,000	20,000	.00138	.00011	.00017	.00010	
21,000	21,000	.00148	.00010	.....	.....	
22,000	22,000	.00160	.00012	.....	.....	
23,000	23,000	.00172	.00012	.....	.....	
24,000	24,000	.00188	.00016	.....	.....	
25,000	25,000	.00203	.00015	.....	.....	
26,000	26,000	.00220	.00017	.....	.....	
27,000	27,000	.00238	.00018	.....	.....	
28,000	28,000	.00261	.00023	.00073	.00056	
34,420	34,420	.....	.....	.....	.....	Tensile strength.

Fractured 3″.2 from neck. Appearance fine granular, light gray.

RACER.

No. 6245.

Marks, R 142.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00011	.00006			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00028	.00006			
7,000	7,000	.00033	.00005			
8,000	8,000	.00039	.00006			
9,000	9,000	.00046	.00007			
10,000	10,000	.00052	.00006	.00001	.00001	
11,000	11,000	.00060	.00008			
12,000	12,000	.00067	.00007			
13,000	13,000	.00074	.00007			
14,000	14,000	.00081	.00007			
15,000	15,000	.00090	.00009	.00005	.00004	
16,000	16,000	.00100	.00010			
17,000	17,000	.00110	.00010			
18,000	18,000	.00120	.00010			
19,000	19,000	.00131	.00011			
20,000	20,000	.00142	.00011	.00020	.00015	
21,000	21,000	.00154	.00012			
22,000	22,000	.00170	.00016			
23,000	23,000	.00185	.00015			
24,000	24,000	.00203	.00018			
25,000	25,000	.00221	.00018			
26,000	26,000	.00249	.00028			
27,000	27,000	.00274	.00025	.00090	.00070	
33,750	33,750					Tensile strength.

Fractured 2″.6 from neck. Appearance fine granular, light gray.

RACER.

No. 6247.

Marks, R 144.
Diameter, 1″.129.
Sectional area, 1.00 square inch
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00016	.00005	.....	.....	
5,000	5,000	.00021	.00005	.....	.....	
6,000	6,000	.00028	.00007	.....	.....	
7,000	7,000	.00032	.00004	.....	.....	
8,000	8,000	.00039	.00007	.....	.....	
9,000	9,000	.00046	.00007	.....	.....	
10,000	10,000	.00051	.00005	.00003	.00003	
11,000	11,000	.00060	.00009	.....	.....	
12,000	12,000	.00067	.00007	.....	.....	
13,000	13,000	.00073	.00006	.....	.....	
14,000	14,000	.00082	.00009	.....	.....	
15,000	15,000	.00090	.00008	.00010	.00007	
16,000	16,000	.00099	.00009	.....	.....	
17,000	17,000	.00109	.00010	.....	.....	
18,000	18,000	.00118	.00009	.....	.....	
19,000	19,000	.00128	.00010	.....	.....	
20,000	20,000	.00139	.00011	.00021	.00011	
21,000	21,000	.00150	.00011	.....	.....	
22,000	22,000	.00161	.00011	.....	.....	
23,000	23,000	.00177	.00016	.....	.....	
24,000	24,000	.00190	.00013	.....	.....	
25,000	25,000	.00210	.00020	.....	.....	
26,000	26,000	.00227	.00017	.....	.....	
27,000	27,000	.00251	.00024	.00078	.00057	
32,900	32,900	.....	.....	.....	.....	Tensile strength.

Fractured 1″.3 from neck. Appearance fine granular, gray.

RACER.

No. 6106.

Marks, R 113.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00020	.00008	.....	.....	
5,000	5,000	.00026	.00006	.....	.....	
6,000	6,000	.00032	.00006	.....	.....	
7,000	7,000	.00040	.00008	.....	.....	
8,000	8,000	.00048	.00008	.....	.....	
9,000	9,000	.00055	.00007	.....	.....	
10,000	10,000	.00062	.00007	.00001	.00001	
11,000	11,000	.00070	.00008	.....	.....	
12,000	12,000	.00079	.00009	.....	.....	
13,000	13,000	.00088	.00009	.....	.....	
14,000	14,000	.00098	.00010	.....	.....	
15,000	15,000	.00107	.00009	.00008	.00007	
16,000	16,000	.00115	.00008	.....	.....	
17,000	17,000	.00125	.00010	.....	.....	
18,000	18,000	.00136	.00011	.....	.....	
19,000	19,000	.00149	.00013	.....	.....	
20,000	20,000	.00161	.00012	.00023	.00015	
21,000	21,000	.00175	.00014	.....	.....	
22,000	22,000	.00191	.00016	.....	.....	
23,000	23,000	.00212	.00021	.....	.....	
24,000	24,000	.00230	.00018	.....	.....	
25,000	25,000	.00251	.00021	.00068	.00045	
31,610	31,610	.....	.....	.....	.....	Tensile strength.

Fractured 1″.2 from neck. Appearance, fine granular, gray.

RACER.

No. 6108.

Marks, R 115.
Diameter, 1″.129.
Sectional area, 1.00 square inch
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00029	.00007			
7,000	7,000	.00035	.00006			
8,000	8,000	.00041	.00006			
9,000	9,000	.00047	.00006			
10,000	10,000	.00052	.00005	.00001	.00001	
11,000	11,000	.00060	.00008			
12,000	12,000	.00068	.00008			
13,000	13,000	.00074	.00006			
14,000	14,000	.00081	.00007			
15,000	15,000	.00090	.00009	.00007	.00006	
16,000	16,000	.00099	.00009			
17,000	17,000	.00107	.00008			
18,000	18,000	.00114	.00007			
19,000	19,000	.00123	.00009			
20,000	20,000	.00132	.00009	.00011	.00004	
21,000	21,000	.00144	.00012			
22,000	22,000	.00156	.00012			
23,000	23,000	.00168	.00012			
24,000	24,000	.00180	.00012			
25,000	25,000	.00195	.00015			
26,000	26,000	.00210	.00015			
27,000	27,000	.00230	.00020			
28,000	28,000	.00250	.00020	.00061	.00050	
33,020	33,020					Tensile strength.

Fractured at the neck. Appearance fine granular, gray.

RACER.

No. 6266.

Marks, R 149.
Diameter, 1″. 129.
Sectional area, 1.00 square inch
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004			
3,000	3,000	.00010	.00006			
4,000	4,000	.00015	.00005			
5,000	5,000	.00021	.00006			
6,000	6,000	.00028	.00007			
7,000	7,000	.00032	.00004			
8,000	8,000	.00038	.00006			
9,000	9,000	.00044	.00006			
10,000	10,000	.00052	.00008	.00001	.00001	
11,000	11,000	.00058	.00006			
12,000	12,000	.00065	.00007			
13,000	13,000	.00072	.00007			
14,000	14,000	.00080	.00008			
15,000	15,000	.00088	.00008	.00005	.00004	
16,000	16,000	.00096	.00008			
17,000	17,000	.00104	.00008			
18,000	18,000	.00113	.00009			
19,000	19,000	.00122	.00009			
20,000	20,000	.00132	.00010	.00016	.00011	
21,000	21,000	.00144	.00012			
22,000	22,000	.00155	.00011			
23,000	23,000	.00169	.00014			
24,000	24,000	.00181	.00012			
25,000	25,000	.00198	.00017			
26,000	26,000	.00212	.00014			
27,000	27,000	.00231	.00019			
28,000	28,000	.00256	.00025	.00073	.00057	
33,320	33,320					Tensile strength.

Fractured ″.75 from neck. Appearance, fine granular, light gray, mottled.

RACER.

No. 6268.

Marks, R 151.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00012	.00006			
4,000	4,000	.00019	.00007			
5,000	5,000	.00024	.00005			
6,000	6,000	.00030	.00006			
7,000	7,000	.00037	.00007			
8,000	8,000	.00042	.00005			
9,000	9,000	.00049	.00007			
10,000	10,000	.00057	.00008	.00002	.00002	
11,000	11,000	.00063	.00006			
12,000	12,000	.00070	.00007			
13,000	13,000	.00079	.00009			
14,000	14,000	.00088	.00009			
15,000	15,000	.00098	.00010	.00010	.00008	
16,000	16,000	.00106	.00008			
17,000	17,000	.00117	.00011			
18,000	18,000	.00127	.00010			
19,000	19,000	.00139	.00012			
20,000	20,000	.00151	.00012	.00025	.00015	
21,000	21,000	.00163	.00012			
22,000	22,000	.00179	.00016			
23,000	23,000	.00194	.00015			
24,000	24,000	.00217	.00023			
25,000	25,000	.00239	.00022			
26,000	26,000	.00261	.00022	.00062	.00057	
30,900	30,900					Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray, mottled.

RACER.

No. 6166.

Marks, R 126.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00019	.00007	.....	.....	
5,000	5,000	.00025	.00006	.....	.....	
6,000	6,000	.00031	.00006	.....	.....	
7,000	7,000	.00039	.00008	.....	.....	
8,000	8,000	.00045	.00006	.....	.....	
9,000	9,000	.00052	.00007	.....	.....	
10,000	10,000	.00060	.00008	.00004	.00004	
11,000	11,000	.00067	.00007	.....	.....	
12,000	12,000	.00074	.00007	.....	.....	
13,000	13,000	.00082	.00008	.....	.....	
14,000	14,000	.00090	.00008	.....	.....	
15,000	15,000	.00100	00010	.00010	.00006	
16,000	16,000	.00111	.00011	.....	.....	
17,000	17,000	.00119	.00008	.....	.....	
18,000	18,000	.00129	.00010	.....	.....	
19,000	19,000	.00139	.00010	.....	.....	
20,000	20,000	.00150	.00011	.00023	.00018	
21,000	21,000	.00163	.00013	.....	.....	
22,000	22,000	.00178	.00015	.....	.....	
23,000	23,000	.00192	.00014	.....	.....	
24,000	24,000	.00210	.00018	.....	.....	
25,000	25,000	.00229	.00019	.....	.....	
26,000	26,000	.00250	.00021	.00069	.00046	
31,980	31,980	.....	.....	.....	.....	Tensile strength.

Fractured 1″.50 from neck. Appearance, fine granular, light gray.

RACER.

No. 6190.

Marks, R 134.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00021	.00006	.....	.....	
6,000	6,000	.00026	.00005	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00037	.00006	.....	.....	
9,000	9,000	.00043	.00006	.....	.....	
10,000	10,000	.00050	.00007	.00001	.00001	
11,000	11,000	.00056	.00006	.....	.....	
12,000	12,000	.00062	.00006	.....		
13,000	13,000	.00070	.00008	.....	.....	
14,000	14,000	.00077	.00007	.....	.....	
15,000	15,000	.00068	.00006	.00008	.00002	
16,000	16,000	.00090	.00007	.....	.....	
17,000	17,000	.00099	.00009	.....	.....	
18,000	18,000	.00106	.00007	.....	.....	
19,000	19,000	.00113	.00007	.....	.....	
20,000	20,000	.00121	.00008	.00011	.00008	
21,000	21,000	.00132	.00011	.....	.....	
22,000	22,000	.00141	.00009	.....	.....	
23,000	23,000	.00151	.00010	.....	.....	
24,000	24,000	.00162	.00011	.....	.....	
25,000	25,000	.00176	.00014	.....	.....	
26,000	26,000	.00189	.00013	.....	.....	
27,000	27,000	.00202	.00013	.....	.....	
28,000	28,000	.00220	.00018	.....	.....	
29,000	29,000	.00239	.00019	.....	.....	
30,000	30,000	.00260	.00021	.00071	.00060	
35,280	35,280	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

RACER.

No. 6216.

Marks, R 138.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00010	.00004			
4,000	4,000	.00017	.00007			
5,000	5,000	.00021	.00004			
6,000	6,000	.00028	.00007			
7,000	7,000	.00034	.00006			
8,000	8,000	.00040	.00006			
9,000	9,000	.00047	.00007			
10,000	10,000	.00053	.00006	.00001	.00001	
11,000	11,000	.00060	.00007			
12,000	12,000	.00068	.00008			
13,000	13,000	.00073	.00005			
14,000	14,000	.00081	.00008			
15,000	15,000	.00090	.00009	.00008	.00007	
16,000	16,000	.00098	.00008			
17,000	17,000	.00108	.00010			
18,000	18,000	.00117	.00009			
19,000	19,000	.00127	.00010			
20,000	20,000	.00136	.00009	.00018	.00010	
21,000	21,000	.00149	.00013			
22,000	22,000	.00160	.00011			
23,000	23,000	.00172	.00012			
24,000	24,000	.00189	.00017			
25,000	25,000	.00204	.00015			
26,000	26,000	.00221	.00017			
27,000	27,000	.00248	.00027			
28,000	28,000	.00270	.00022	.00062	.00064	
35,340	35,340					Tensile strength.

Fractured 2″.2 from neck. Appearance, fine granular, light gray.

RACER.

No. 6244.

Marks R 141.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00011	.00006	.....	.....	
4,000	4,000	.00018	.00007	.....	.....	
5,000	5,000	.00023	.00005	.....	.....	
6,000	6,000	.00029	.00006	.....	.....	
7,000	7,000	.00035	.00006	.....	.....	
8,000	8,000	.00041	.00006	.....	.....	
9,000	9,000	.00048	.00007	.....	.....	
10,000	10,000	.00055	.00007	0.	.....	
11,000	11,000	.00061	.00006	.....	.....	
12,000	12,000	.00069	.00008	.....	.....	
13,000	13,000	.00076	.00007	.....	.....	
14,000	14,000	.00082	.00006	.....	.....	
15,000	15,000	.00089	.00007	.00007	.00007	
16,000	16,000	.00098	.00009	.....	.....	
17,000	17,000	.00108	.00010	.....	.....	
18,000	18,000	.00117	.00009	.....	.....	
19,000	19,000	.00127	.00010	.....	.....	
20,000	20,000	.00138	.00011	.00017	.00010	
21,000	21,000	.00148	.00010	.....	.....	
22,000	22,000	.00160	.00012	.....	.....	
23,000	23,000	.00172	.00012	.....	.....	
24,000	24,000	.00188	.00016	.....	.....	
25,000	25,000	.00203	.00015	.....	.....	
26,000	26,000	.00220	.00017	.....	.....	
27,000	27,000	.00238	.00018	.....	.....	
28,000	28,000	.00261	.00023	.00073	.00056	
34,420	34,420	.....	.....	.....	.....	Tensile strength.

Fractured 3″.2 from neck. Appearance fine granular, light gray.

RACER.

No. 6245.

Marks, R 142.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00011	.00006			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00028	.00006			
7,000	7,000	.00033	.00005			
8,000	8,000	.00039	.00006			
9,000	9,000	.00046	.00007			
10,000	10,000	.00052	.00006	.00001	.00001	
11,000	11,000	.00060	.00008			
12,000	12,000	.00067	.00007			
13,000	13,000	.00074	.00007			
14,000	14,000	.00081	.00007			
15,000	15,000	.00090	.00009	.00005	.00004	
16,000	16,000	.00100	.00010			
17,000	17,000	.00110	.00010			
18,000	18,000	.00120	.00010			
19,000	19,000	.00131	.00011			
20,000	20,000	.00142	.00011	.00020	.00015	
21,000	21,000	.00154	.00012			
22,000	22,000	.00170	.00016			
23,000	23,000	.00185	.00015			
24,000	24,000	.00203	.00018			
25,000	25,000	.00221	.00018			
26,000	26,000	.00249	.00028			
27,000	27,000	.00274	.00025	.00090	.00070	
33,750	33,750					Tensile strength.

Fractured 2″.6 from neck. Appearance fine granular, light gray.

RACER.

No. 6247.

Marks, R 144.
Diameter, 1″.129.
Sectional area, 1.00 square inch
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00016	.00005			
5,000	5,000	.00021	.00005			
6,000	6,000	.00028	.00007			
7,000	7,000	.00032	.00004			
8,000	8,000	.00039	.00007			
9,000	9,000	.00046	.00007			
10,000	10,000	.00051	.00005	.00003	.00003	
11,000	11,000	.00060	.00009			
12,000	12,000	.00067	.00007			
13,000	13,000	.00073	.00006			
14,000	14,000	.00082	.00009			
15,000	15,000	.00090	.00008	.00010	.00007	
16,000	16,000	.00099	.00009			
17,000	17,000	.00109	.00010			
18,000	18,000	.00118	.00009			
19,000	19,000	.00128	.00010			
20,000	20,000	.00139	.00011	.00021	.00011	
21,000	21,000	.00150	.00011			
22,000	22,000	.00161	.00011			
23,000	23,000	.00177	.00016			
24,000	24,000	.00190	.00013			
25,000	25,000	.00210	.00020			
26,000	26,000	.00227	.00017			
27,000	27,000	.00251	.00024	.00078	.00057	
32,900	32,900					Tensile strength.

Fractured 1″.3 from neck. Appearance fine granular, gray.

RACER.

No. 6249.

Marks, R 146.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load
2,000	2,000	.00004	.00004			
3,000	3,000	.00009	.00005			
4,000	4,000	.00013	.00004			
5,000	5,000	.00019	.00006			
6,000	6,000	.00024	.00005			
7,000	7,000	.00031	.00007			
8,000	8,000	.00039	.00008			
9,000	9,000	.00044	.00005			
10,000	10,000	.00051	.00007	.00001	.00001	
11,000	11,000	.00058	.00007			
12,000	12,000	.00066	.00008			
13,000	13,000	.00073	.00007			
14,000	14,000	.00080	.00007			
15,000	15,000	.00089	.00009	.00007	.00006	
16,000	16,000	.00099	.00010			
17,000	17,000	.00108	.00009			
18,000	18,000	.00119	.00011			
19,000	19,000	.00128	.00009			
20,000	20,000	.00139	.00011	.00021	.00014	
21,000	21,000	.00151	.00012			
22,000	22,000	.00163	.00012			
23,000	23,000	.00179	.00016			
24,000	24,000	.00195	.00016			
25,000	25,000	.00210	.00015			
26,000	26,000	.00233	.00023			
27,000	27,000	.00258	.00025	.00078	.00057	
33,690	33,690					Tensile strength.

Fractured 1″.6 from neck. Appearance, fine granular, light gray.

RACER.

No. 6251.

Marks, R 148.
Diameter, 1".129.
Sectional area, 1.00 square inch
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00017	.00006	.....	.....	
5,000	5,000	.00022	.00005	.....	.....	
6,000	6,000	.00029	.00007	.....	.....	
7,000	7,000	.00036	.00007	.....	.....	
8,000	8,000	.00042	.00006	.....	.....	
9,000	9,000	.00050	.00008	.....	.....	
10,000	10,000	.00057	.00007	.00002	.00002	
11,000	11,000	.00063	.00006	.....	.....	
12,000	12,000	.00071	.00008	.....	.....	
13,000	13,000	.00080	.00009	.....	.....	
14,000	14,000	.00089	.00009	.....	.....	
15,000	15,000	.00099	.00010	.00011	.00009	
16,000	16,000	.00109	.00010	.....	.....	
17,000	17,000	.00119	.00010	.....	.....	
18,000	18,000	.00130	.00011	.....	.....	
19,000	19,000	.00141	.00011	.....	.....	
20,000	20,000	.00153	.00012	.00028	.00017	
21,000	21,000	.00170	.00017	.....	.....	
22,000	22,000	.00188	.00018	.....	.....	
23,000	23,000	.00204	.00016	.....	.....	
24,000	24,000	.00226	.00022	.....	.....	
25,100	25,000	.00250	.00024	.00079	.00051	
29,400	29,400	.....	.....	.....	.....	Tensile strength.

Fractured ".5 from neck. Appearance, granular, gray.

RACER.

No. 6266.

Marks, R 149.
Diameter, 1″. 129.
Sectional area, 1.00 square inch
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004			
3,000	3,000	.00010	.00006			
4,000	4,000	.00015	.00005			
5,000	5,000	.00021	.00006			
6,000	6,000	.00028	.00007			
7,000	7,000	.00032	.00004			
8,000	8,000	.00038	.00006			
9,000	9,000	.00044	.00006			
10,000	10,000	.00052	.00008	.00001	.00001	
11,000	11,000	.00058	.00006			
12,000	12,000	.00065	.00007			
13,000	13,000	.00072	.00007			
14,000	14,000	.00080	.00008			
15,000	15,000	.00088	.00008	.00005	.00004	
16,000	16,000	.00096	.00008			
17,000	17,000	.00104	.00008			
18,000	18,000	.00113	.00009			
19,000	19,000	.00122	.00009			
20,000	20,000	.00132	.00010	.00016	.00011	
21,000	21,000	.00144	.00012			
22,000	22,000	.00155	.00011			
23,000	23,000	.00169	.00014			
24,000	24,000	.00181	.00012			
25,000	25,000	.00198	.00017			
26,000	26,000	.00212	.00014			
27,000	27,000	.00231	.00019			
28,000	28,000	.00256	.00025	.00078	.00067	
33,320	33,320					Tensile strength.

Fractured ″.75 from neck. Appearance, fine granular, light gray, mottled.

RACER.

No. 6268.

Marks, R 151.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00012	.00006			
4,000	4,000	.00019	.00007			
5,000	5,000	.00024	.00005			
6,000	6,000	.00030	.00006			
7,000	7,000	.00037	.00007			
8,000	8,000	.00042	.00005			
9,000	9,000	.00049	.00007			
10,000	10,000	.00057	.00008	.00002	.00002	
11,000	11,000	.00063	.00006			
12,000	12,000	.00070	.00007			
13,000	13,000	.00079	.00009			
14,000	14,000	.00088	.00009			
15,000	15,000	.00098	.00010	.00010	.00008	
16,000	16,000	.00106	.00008			
17,000	17,000	.00117	.00011			
18,000	18,000	.00127	.00010			
19,000	19,000	.00139	.00012			
20,000	20,000	.00151	.00012	.00025	.00015	
21,000	21,000	.00163	.00012			
22,000	22,000	.00179	.00016			
23,000	23,000	.00194	.00015			
24,000	24,000	.00217	.00023			
25,000	25,000	.00239	.00022			
26,000	26,000	.00261	.00022	.00082	.00057	
30,900	30,900					Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray, mottled.

RACER.

No. 6285.

Marks, R 152.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
1,000	1,000	0.	0.	0.	0.	
2,000	2,000	.00005	.00005			
3,000	3,000	.00010	.00005			
4,000	4,000	.00015	.00005			
5,000	5,000	.00021	.00006			
6,000	6,000	.00027	.00006			
7,000	7,000	.00032	.00005			
8,000	8,000	.00040	.00008			
9,000	9,000	.00046	.00006			
10,000	10,000	.00052	.00006	0.		
11,000	11,000	.00060	.00008			
12,000	12,000	.00067	.00007			
13,000	13,000	.00073	.00006			
14,000	14,000	.00081	.00008			
15,000	15,000	.00090	.00009	.00006	.00006	
16,000	16,000	.00099	.00009			
17,000	17,000	.00108	.00009			
18,000	18,000	.00118	.00010			
19,000	19,000	.00128	.00010			
20,000	20,000	.00140	.00012	.00019	.00013	
21,000	21,000	.00152	.00012			
22,000	22,000	.00163	.00011			
23,000	23,000	.00179	.00016			
24,000	24,000	.00200	.00021			
25,000	25,000	.00217	.00017			
26,000	26,000	.00240	.00023			
27,000	27,000	.00262	.00022	.00081	.00062	
33,670	33,670					Tensile strength.

Fractured ″.55 from neck. Appearance, fine granular, light gray.

RACER.

No. 6287.

Marks, R 155.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10.″
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00017	.00007	.....	.....	
5,000	5,000	.00022	.00005	.....	.....	
6,000	6,000	.00028	.00006	.....	.....	
7,000	7,000	.00033	.00005	.....	.....	
8,000	8,000	.00039	.00006	.....	.....	
9,000	9,000	.00046	.00007	.....	.....	
10,000	10,000	.00050	.00004	.00001	.00001	
11,000	11,000	.00058	.00008	.....	.....	
12,000	12,000	.00067	.00009	.....	.....	
13,000	13,000	.00073	.00006	.....	.....	
14,000	14,000	.00079	.00006	.....	.....	
15,000	15,000	.00087	.00008	.00007	.00006	
16,000	16,000	.00096	.00009	.....	.....	
17,000	17,000	.00102	.00006	.....	.....	
18,000	18,000	.00110	.00008	.....	.....	
19,000	19,000	.00120	.00010	.....	.....	
20,000	20,000	.00130	.00010	00017	.00010	
21,000	21,000	.00140	.00010	.....	.....	
22,000	22,000	.00151	.00011	.....	.....	
23,000	23,000	.00162	.00011	.....	.....	
24,000	24,000	.09178	.00016	.....	.....	
25,000	25,000	.00192	.00014	.....	.....	
26,000	26,000	.00212	.00020	.....	.....	
27,000	27,000	.00230	.00018	.....	.....	
28,000	28,000	.00252	.00022	.00075	.00058	
35,300	35,300	.....	.....	.....	.....	Tensile strength.

Fractured 3″.6 from neck. Appearance, fine granular, light gray.

RACER.

No. 6304.

Marks, R 159.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00012	.00006			
4,000	4,000	.00018	.00006			
5,000	5,000	.00022	.00004			
6,000	6,000	.00028	.00006			
7,000	7,000	.00033	.00005			
8,000	8,000	.00040	.00007			
9,000	9,000	.00047	.00007			
10,000	10,000	.00053	.00006	.00001	.00001	
11,000	11,000	.00060	.00007			
12,000	12,000	.00068	.00008			
13,000	13,000	.00075	.00007			
14,000	14,000	.00083	.00008			
15,000	15,000	.00091	.00008	.00009	.00008	
16,000	16,000	.00102	.00011			
17,000	17,000	.00110	.00008			
18,000	18,000	.00119	.00009			
19,000	19,000	.00129	.00010			
20,000	20,000	.00140	.00011	.00020	.00011	
21,000	21,000	.00151	.00011			
22,000	22,000	.00164	.00013			
23,000	23,000	.00180	.00016			
24,000	24,000	.00198	.00013			
25,000	25,000	.00212	.00019			
26,000	26,000	.00232	.00020			
27,000	27,000	.00256	.00024	.00078	.00058	
34,100	34,100	.....	.....	.....	.....	Tensile strength.

Fractured ″.85 from neck. Appearance, fine granular, gray.

RACER.

No. 6325.

Marks, R 160.
Diameter, 1″.129.
Sectional area, 1.00 square inch
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	.....	.....	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00038	.00007	.....	.....	
9,000	9,000	.00045	.00007	.....	.....	
10,000	10,000	.00051	.00006	.00001	.00001	
11,000	11,000	.00059	.00008	.....	.....	
12,000	12,000	.00067	.00008	.....	.....	
13,000	13,000	.00074	.00007	.....	.....	
14,000	14,000	.00081	.00007	.....	.....	
15,000	15,000	.00090	.00009	.00007	.00006	
16,000	16,000	.00100	.00010	.....	.....	
17,000	17,000	.00110	.00010	.....	.....	
18,000	18,000	.00120	.00010	.....	.....	
19,000	19,000	.00131	.00011	.....	.....	
20,000	20,000	.00141	.00010	.00020	.00013	
21,000	21,000	.00158	.00012	.....	.....	
22,000	22,000	.00169	.00016	.....	.....	
23,000	23,000	.00184	.00015	.....	.....	
24,000	24,000	.00204	.00020	.....	.....	
25,000	25,000	.00226	.00022	.....	.....	
26,000	26,000	.00249	.00023	.00073	.00053	
34,500	34,500	.....	.....	.....	.....	Tensile strength.

Fractured 1″.2 from neck. Appearance, fine granular, gray.

RACER.

No. 6327.

Marks, R 162.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00018	.00006	.....	.....	
5,000	5,000	.00023	.00005	.....	.....	
6,000	6,000	.00030	.00007	.....	.....	
7,000	7,000	.00036	.00006	.....	.....	
8,000	8,000	.00042	.00006	.....	.....	
9,000	9,000	.00049	.00007	.....	.....	
10,000	10,000	.00057	.00008	.00002	.00002	
11,000	11,000	.00062	.00005	.....	.....	
12,000	12,000	.00070	.00008	.....	.....	
13,000	13,000	.00077	.00007	.....	.....	
14,000	14,000	.00086	.00009	.....	.....	
15,000	15,000	.00094	.00008	.00008	.00006	
16,000	16,000	.00102	.00008	.....	.....	
17,000	17,000	.00113	.00011	.....	.....	
18,000	18,000	.00121	.00008	.....	.....	
19,000	19,000	.00133	.00012	.....	.....	
20,000	20,000	.00146	.00013	.00020	.00012	
21,000	21,000	.00157	.00011	.....	.....	
22,000	22,000	.00172	.00015	.....	.....	
23,000	23,000	.00185	.00013	.....	.....	
24,000	24,000	.00203	.00018	.....	.....	
25,000	25,000	.00220	.00017	.....	.....	
26,000	26,000	.00241	.00021	.....	.....	
27,000	27,000	.00269	.00028	.00084	.00064	
34,390	34,390	.....	.....	.....	.....	Tensile strength.

Fractured ".7 from neck. Appearance, fine granular, gray.

RACER.

No. 6330.

Marks, R 165.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00012	.00006			
4,000	4,000	.00017	.00005			
5,000	5,000	.00024	.00007			
6,000	6,000	.00029	.00005			
7,000	7,000	.00036	.00007			
8,000	8,000	.00041	.00005			
9,000	9,000	.00047	.00006			
10,000	10,000	.00056	.00009	.00004	.00004	
11,000	11,000	.00063	.00007			
12,000	12,000	.00069	.00006			
13,000	13,000	.00077	.00008			
14,000	14,000	.00086	.00009			
15,000	15,000	.00096	.00010	.00007	.00003	
16,000	16,000	.00105	.00009			
17,000	17,000	.00114	.00009			
18,000	18,000	.00123	.00009			
19,000	19,000	.00134	.00011			
20,000	20,000	.00146	.00012	.00017	.00010	
21,000	21,000	.00156	.00010			
22,000	22,000	.00168	.00012			
23,000	23,000	.00184	.00016			
24,000	24,000	.00196	.00012			
25,000	25,000	.00216	.00020			
26,000	26,000	.00236	.00020			
27,000	27,000	.00256	.00020	.00068	.00051	
31,820	31,820					Tensile strength.

Fractured 1″ from the neck. Appearance, fine granular, light gray.

RACER.

No. 6331.

Marks, R 166.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00020	.00008	.....	.....	
5,000	5,000	.00027	.00007	.....	.....	
6,000	6,000	.00033	.00006	.....	.....	
7,000	7,000	.00040	.00007	.....	.....	
8,000	8,000	.00048	.00008	.....	.....	
9,000	9,000	.00055	.00007	.....	.....	
10,000	10,000	.00062	.00007	.00004	.00004	
11,000	11,000	.00071	.00009	.....	.....	
12,000	12,000	.00080	.00009	.....	.....	
13,000	13,000	.00090	.00010	.....	.....	
14,000	14,000	.00100	.00010	.....	.....	
15,000	15,000	.00110	.00010	.00017	.00013	
16,000	16,000	.00123	.00013	.....	.....	
17,000	17,000	.00138	.00015	.....	.....	
18,000	18,000	.00151	.00013	.....	.....	
19,000	19,000	.00171	.00020	.....	.....	
20,000	20,000	.00190	.00019	.00050	.00033	
21,000	21,000	.00219	.00029	.....	.....	
22,000	22,000	.00245	.00026	.....	.....	
23,000	23,000	.00277	.00032	.....	.....	
24,000	24,000	.00319	.00042	.....	.....	
25,000	25,000	.00371	.00052	.00182	.00132	
29,900	29,900	.....	.....	.....	.....	Tensile strength.

Fractured ″.3 from neck. Appearance, fine granular, gray.

RACER.

No. 6370.

Marks, R 168.
Diameter, 1″,129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00020	.00008	.....	.....	
5,000	5,000	.00026	.00006	.....	.....	
6,000	6,000	.00031	.00005	.....	.....	
7,000	7,000	.00039	.00008	.....	.....	
8,000	8,000	.00046	.00007	.....	.....	
9,000	9,000	.00053	.00007	.....	.....	
10,000	10,000	.00061	.00008	.00002	.00002	
11,000	11,000	.00069	.00008	.....	.....	
12,000	12,000	.00078	.00009	.....	.....	
13,000	13,000	.00088	.00010	.....	.....	
14,000	14,000	.00098	.00010	.....	.....	
15,000	15,000	.00108	.00010	.00010	.00008	
16,000	16,000	.00119	.00011	.....	.....	
17,000	17,000	.00130	.00011	.....	.....	
18,000	18,000	.00142	.00012	.....	.....	
19,000	19,000	.00157	.00015	.....	.....	
20,000	20,000	.00171	.00014	.00080	.00020	
21,000	21,000	.00189	.00018	.....	.....	
22,000	22,000	.00210	.00021	.....	.....	
23,000	23,000	.00230	.00020	.....	.....	
24,000	24,000	.00255	.00025	.....	.....	
25,000	25,000	.00289	.00035	.00101	.00071	
30,990	30,990	.....	.....	.....	.....	Tensile strength.

Fractured, ″.75 from neck. Appearance, fine granular, gray.

RACER.

No. 6371.

Marks, R 169.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00018	.00007	.....	.....	
5,000	5,000	.00025	.00007	.....	.....	
6,000	6,000	.00031	.00006	.....	.....	
7,000	7,000	.00038	.00007	.....	.....	
8,000	8,000	.00046	.00008	.....	.....	
9,000	9,000	.00051	.00005	.....	.....	
10,000	10,000	.00059	.00008	.00002	.00002	
11,000	11,000	.00067	.00008	.....	.....	
12,000	12,000	.00076	.00009	.....	.....	
13,000	13,000	.00084	.00008	.....	.....	
14,000	14,000	.00091	.00007	.....	.....	
15,000	15,000	.00100	.00009	.00008	.00006	
16,000	16,000	.00108	.00008	.....	.....	
17,000	17,000	.00120	.00012	.....	.....	
18,000	18,000	.00131	.00011	.....	.....	
19,000	19,000	.00143	.00012	.....	.....	
20,000	20,000	.00156	.00013	.00025	.00017	
21,000	21,000	.00170	.00014	.....	.....	
22,000	22,000	.00187	.00017	.....	.....	
23,000	23,000	.00202	.00015	.....	.....	
24,000	24,000	.00220	.00018	.....	.....	
25,000	25,000	.00250	.00030	.00072	.00047	
31,700	31,700	.....	.....	.....	.....	Tensile strength.

Fractured ″.65 from neck. Appearance, fine granular, gray.

DICKSON DYNAMITE GUN.

CAST-IRON BARRELS.

No. 6189.

Marks, 135.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00011	.00006	.....	.....	
4,000	4,000	.00017	.00006	.....	.....	
5,000	5,000	.00022	.00005	.....	.....	
6,000	6,000	.00028	.00006	.....	.....	
7,000	7,000	.00033	.00005	.....	.....	
8,000	8,000	.00041	.00008	.....	.....	
9,000	9,000	.00048	.00007	.....	.....	
10,000	10,000	.00055	.00007	.00002	.00002	
11,000	11,000	.00061	.00006	.....	.....	
12,000	12,000	.00070	.00009	.....	.....	
13,000	13,000	.00076	.00006	.....	.....	
14,000	14,000	.00082	.00006	.....	.....	
15,000	15,000	.00091	.00009	.00009	.00007	
16,000	16,000	.00098	.00007	.....	.....	
17,000	17,000	.00110	.00012	.....	.....	
18,000	18,000	.00119	.00009	.....	.....	
19,000	19,000	.00130	.00011	.....	.....	
20,000	20,000	.00140	.00010	.00020	.00011	
21,000	21,000	.00152	.00012	.....	.....	
22,000	22,000	.00164	.00012	.....	.....	
23,000	23,000	.00180	.00016	.....	.....	
24,000	24,000	.00198	.00018	.....	.....	
25,000	25,000	.00216	.00018	.....	.....	
26,000	26,000	.00235	.00019	.....	.....	
27,000	27,000	.00260	.00025	.00061	.00061	
31,900	31,900	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray, mottled.

No. 6192.

Marks, $\frac{12\text{-}19}{1000}$.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 2".
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00010	.00010	.....	.....	
3,000	3,000	.00020	.00010	.....	.....	
4,000	4,000	.00025	.00005	.....	.....	
5,000	5,000	.00030	.00005	.....	.....	
6,000	6,000	.00040	.00010	.....	.....	
7,000	7,000	.00045	.00005	.....	.....	
8,000	8,000	.00050	.00005	.....	.....	
9,000	9,000	.00060	.00010	.....	.....	
10,000	10,000	.00070	.00010	.00005	.00005	
11,000	11,000	.00075	.00005	.....	.....	
12,000	12,000	.00085	.00010	.....	.....	
13,000	13,000	.00095	.00010	.....	.....	
14,000	14,000	.00105	.00010	.....	.....	
15,000	15,000	.00125	.00020	.00020	.00015	
16,000	16,000	.00135	.00010	.....	.....	
17,000	17,000	.00150	.00015	.....	.....	
18,000	18,000	.00160	.00010	.....	.....	
19,000	19,000	.00170	.00010	.....	.....	
20,000	20,000	.00190	.00020	.00040	.00020	
21,000	21,000	.00210	.00020	.....	.....	
22,000	22,000	.00225	.00015	.....	.....	
23,000	23,000	.00245	.00020	.....	.....	
24,000	24,000	.00280	.00035	.....	.....	
25,000	25,000	.00310	.00030	.00105	.00065	
28,950	28,950	.....	.....	.....	.....	Tensile strength.

Fractured ".2 from neck. Appearance, fine granular, dark gray.

No. 6214.

Marks, 1–7–99.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 2″.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	.....	.....	
6,000	6,000	.00025	.00005	.....	.....	
7,000	7,000	.00035	.00010	.....	.....	
8,000	8,000	.00040	.00005	.....	.....	
9,000	9,000	.00050	.00010	.....	.....	
10,000	10,000	.00060	.00010	.00005	.00005	
11,000	11,000	.00070	.00010	.....	.....	
12,000	12,000	.00080	.00010	.....	.....	
13,000	13,000	.00090	.00010	.....	.....	
14,000	14,000	.00100	.00010	.....	.....	
15,000	15,000	.00110	.00010	.00015	.00010	
16,000	16,000	.00120	.00010	.....	.....	
17,000	17,000	.00130	.00010	.....	.....	
18,000	18,000	.00145	.00015	.....	.....	
19,000	19,000	.00160	.00015	.....	.....	
20,000	20,000	.00180	.00020	.00040	.00025	
21,000	21,000	.00205	.00025	.....	.....	
22,000	22,000	.00230	.00025	.....	.....	
23,000	23,000	.00260	.00030	.....	.....	
24,000	24,000	.00300	.00040	.....	.....	
25,000	25,000	.00345	.00045	.00155	.00115	
30,150	30,150	.....	.....	.....	.....	Tensile strength.

Fractured 6″ from neck. Appearance, fine granular, gray.

No. 6215.

Marks, 137.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00009	.00005	.....	.....	
4,000	4,000	.00016	.00007	.....	.....	
5,000	5,000	.00020	.00004	.....	.....	
6,000	6,000	.00027	.00007	.....	.....	
7,000	7,000	.00033	.00006	.....	.....	
8,000	8,000	.00039	.00006	.....	.....	
9,000	9,000	.00046	.00007	.....	.....	
10,000	10,000	.00052	.00006	.00002	.00002	
11,000	11,000	.00058	.00006	.....	.....	
12,000	12,000	.00066	.00008	.....	.....	
13,000	13,000	.00075	.00009	.....	.....	
14,000	14,000	.00083	.00008	.....	.....	
15,000	15,000	.00091	.00008	.00007	.00005	
16,000	16,000	.00100	.00009	.....	.....	
17,000	17,000	.00109	.00009	.....	.....	
18,000	18,000	.00120	.00011	.....	.....	
19,000	19,000	.00130	.00010	.....	.....	
20,000	20,000	.00139	.00009	.00017	.00010	
21,000	21,000	.00150	.00011	.....	.....	
22,000	22,000	.00161	.00011	.....	.....	
23,000	23,000	.00174	.00013	.....	.....	
24,000	24,000	.00190	.00016	.....	.....	
25,000	25,000	.00207	.00017	.....	.....	
26,000	26,000	.00222	.00015	.....	.....	
27,000	27,000	.00245	.00023	.....	.....	
28,000	28,000	.00268	.00023	.00074	.00057	
33,810	33,810	.....	.....	.....	.....	Tensile strength.

Fractured 4″.5 from neck. Appearance, granular, light gray, mottled.

No. 6252.

Marks, 2–11–99.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 2″.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00010	.00010			
3,000	3,000	.00015	.00005			
4,000	4,000	.00020	.00005			
5,000	5,000	.00025	.00005			
6,000	6,000	.00030	.00005			
7,000	7,000	.00035	.00005			
8,000	8,000	.00045	.00010			
9,000	9,000	.00055	.00010			
10,000	10,000	.00065	.00010	.00005	.00005	
11,000	11,000	.00080	.00015			
12,000	12,000	.00090	.00010			
13,000	13,000	.00100	.00010			
14,000	14,000	.00110	.00010			
15,000	15,000	.00125	.00015	.00015	.00010	
16,000	16,000	.00140	.00015			
17,000	17,000	.00155	.00015			
18,000	18,000	.00175	.00020			
19,000	19,000	.00195	.00020			
20,000	20,000	.00220	.00025	.00060	.00045	
21,000	21,000	.00250	.00030			
22,000	22,000	.00285	.00035			
23,000	23,000	.00330	.00045			
24,000	24,000	.00385	.00055			
25,000	25,000	.00470	.00085	.00255	.00195	
26,980	26,980					Tensile strength.

Fractured .″25 from neck. Appearance, granular, gray.

No. 6269.

Marks, 2–23.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 2″.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00020	.00010	.....	.....	
5,000	5,000	.00030	.00010	.....	.....	
6,000	6,000	.00035	.00005	.....	.....	
7,000	7,000	.00045	.00010	.....	.....	
8,000	8,000	.00055	.00010	.....	.....	
9,000	9,000	.00065	.00010	.....	.....	
10,000	10,000	.00080	.00015	.00015	.00015	
11,000	11,000	.00095	.00015	.....	.....	
12,000	12,000	.00110	.00015	.....	.....	
13,000	13,000	.00125	.00015	.....	.....	
14,000	14,000	.00140	.00015	.....	.....	
15,000	15,000	.00155	.00015	.00040	.00025	
16,000	16,000	.00180	.00025	.....	.....	
17,000	17,000	.00205	.00025	.....	.....	
18,000	18,000	.00230	.00025	.....	.....	
19,000	19,000	.00270	.00040	.....	.....	
20,000	20,000	.00315	.00045	.00140	.00100	
21,000	21,000	.00370	.00055	.....	.....	
22,000	22,000	.00435	.00065	.....	.....	
23,000	23,000	.00510	.00075	.....	.....	
24,000	24,000	.00635	.00125	.....	.....	
25,000	25,000	.00815	.00180	.00575	.00435	
25,710	25,710	.....	.....	.....	.....	Tensile strength.

Fractured ″.25 from neck. Appearance, fine granular, dark gray.

No. 6333.

Marks, 4–14.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 2″.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	
2,000	2,000	.000100	.000100	.....	.....	
3,000	3,000	.000200	.000100	.....	.....	
4,000	4,000	.000250	.000050	.....	.....	
5,000	5,000	.000300	.000050	.....	.....	
6,000	6,000	.000350	.000050	.....	.....	
7,000	7,000	.000400	.000050	.....	.....	
8,000	8,000	.000500	.000100	.....	.....	
9,000	9,000	.000600	.000100	.....	.....	
10,000	10,000	.000650	.000050	0.	.....	
11,000	11,000	.000750	.000100	.....	.....	
12,000	12,000	.000800	.000050	.....	.....	
13,000	13,000	.000950	.000150	.....	.....	
14,000	14,000	.001050	.000100	.....	.....	
15,000	15,000	.001150	.000100	.000150	.000150	
16,000	16,000	.001300	.000150	.....	.....	
17,000	17,000	.001400	.000100	.....	.....	
18,000	18,000	.001550	.000150	.....	.....	
19,000	19,000	.001750	.000200	.....	.....	
20,000	20,000	.001900	.000150	.000400	.000250	
21,000	21,000	.002100	.000200	.....	.....	
22,000	22,000	.002350	.000250	.....	.....	
23,000	23,000	.002650	.000300	.....	.....	
24,000	24,000	.002900	.000250	.....	.....	
25,000	25,000	.003350	.000450	.001350	.000950	
29,200	29,200	.....	.....	.....	.....	Tensile strength.

Fractured ″.3 from the neck. Appearance, fine granular, dark gray.

CAST IRON

FROM

WATERTOWN ARSENAL FOUNDRY

AND

PIG IRONS.

633

The specimens of cast iron were taken from cylinders 18″ long by 8″ diameter, cored 3½″ diameter, poured from the same metal as the castings they represented.

Specimens of pig iron were turned down directly from sample pigs.

The furnace charges were as follows:

The scrap iron used was heads of shot and shell of previous casts, old shot and shell, bolsters, and gun-carriage scrap of good quality.

Date of cast.	Furnace charge.	Pounds.	Furnace.	No. of tension test.
February 21, 1899	Muirkirk pig	2,000	Cupola	5936
	Salisbury carbonate pig	3,500		
	Scrap	6,100		
	Total	11,600		
February 25, 1899	Muirkirk pig	6,000	Air furnace	5930
	Salisbury carbonate pig	18,000		
	Scrap	24,000		
	Total	48,000		
March 1, 1899	Muirkirk pig	4,000	Cupola	5937
	Salisbury carbonate pig	8,000		
	Scrap	8,000		
	Total	20,000		
March 3, 1899	Muirkirk pig	4,000	Cupola	5944
	Salisbury carbonate pig	2,000		
	Scrap	12,000		
	Total	18,000		
March 7, 1899	Muirkirk pig	2,000	Air furnace	5934
	Salisbury carbonate pig	4,000		
	Soft pig	8,000		
	Scrap	16,000		
	Total	30,000		
March 9, 1899	Muirkirk pig	4,000	Cupola	5939
	Salisbury pig	4,000		
	Soft pig	3,000		
	Scrap	10,000		
	Total	21,000		
March 11, 1899	Muirkirk pig	2,000	Air furnace	5940
	Salisbury carbonate pig	4,000		
	Soft pig	10,000		
	Scrap	14,000		
	Total	30,000		
March 14, 1899	Muirkirk pig	2,000	Air furnace	5941
	Salisbury pig	7,000		
	Soft pig	7,500		
	Scrap	13,000		
	Total	29,500		
March 16, 1899	Muirkirk pig	4,000	Air furnace	5943
	Salisbury pig	9,000		
	Soft pig	8,000		
	Scrap	5,000		
	Total	26,000		
March 21, 1899	Muirkirk pig	3,000	Air furnace	5945
	Salisbury pig	11,000		
	Soft pig	11,000		
	Scrap	15,000		
	Total	40,000		

Date of cast.	Furnace charge.	Pounds.	Furnace.	No. of tension test.
March 25, 1899	Muirkirk pig	1,500	Air furnace	5946
	Salisbury pig	6,500		
	Soft pig	7,500		
	Scrap	13,000		
	Total	28,500		
March 29, 1899	Muirkirk pig	1,000	Air furnace	5947
	Salisbury pig	4,000		
	Soft pig	7,000		
	Scrap	14,000		
	Total	26,000		
April 8, 1899	Muirkirk pig	1,000	Air furnace	5948
	Salisbury pig	5,000		
	Soft pig	8,000		
	Scrap	17,000		
	Total	31,000		
April 15, 1899	Muirkirk pig	1,000	Cupola	5951
	Salisbury pig	1,000		
	Scrap	16,000		
	Total	18,000		
April 18, 1899	Muirkirk pig	2,000	Cupola	5953
	Salisbury pig	7,000		
	Scrap	16,000		
	Total	25,000		
April 22, 1899	Muirkirk pig	2,500	Air furnace	5955
	Salisbury pig	12,000		
	Soft pig	8,000		
	Scrap	17,000		
	Total	39,000		
April 27, 1899	Muirkirk pig	1,500	Air furnace	5956
	Salisbury pig	5,000		
	Soft pig	7,500		
	Scrap	16,000		
	Total	30,000		
May 5, 1899	Muirkirk pig	1,000	Air furnace	5957
	Salisbury pig	9,000		
	Soft pig	7,000		
	Scrap	19,000		
	Total	36,000		
May 8, 1899	Muirkirk pig	1,000	Air furnace	5958
	Salisbury pig	5,000		
	Soft pig	6,000		
	Scrap	20,000		
	Total	32,000		
May 15, 1899	Salisbury pig	6,000	Air furnace	5959
	Soft pig	6,000		
	Scrap	24,000		
	Total	36,000		
May 19, 1899	Salisbury pig	5,000	Air furnace	5964
	Soft pig	7,000		
	Scrap	21,000		
	Total	33,000		
May 23, 1899	Salisbury pig	7,000	Air furnace	5965
	Soft pig	7,000		
	Scrap	26,000		
	Total	40,000		

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
May 27, 1899	Salisbury pig	6,000	Air furnace	5966
	Soft pig	10,000		
	Scrap	23,000		
	Total	39,000		
June 2, 1899	Salisbury pig	6,000	Air furnace	5969
	Soft pig	8,000		
	Scrap	20,000		
	Total	34,000		
June 8, 1899	Salisbury pig	6,000	Air furnace	5971
	Soft pig	9,500		
	Scrap	20,500		
	Total	36,000		
June 14, 1899	Salisbury pig	6,000	Air furnace	5980
	Soft pig	10,000		
	Scrap	24,500		
	Total	40,500		
June 17, 1899	Salisbury pig	6,000	Air furnace	5981
	Soft pig	8,000		
	Scrap	17,000		
	Total	31,000		
June 22, 1899	Salisbury pig	6,000	Air furnace	5982
	Soft pig	9,000		
	Scrap	18,000		
	Total	33,000		
June 26, 1899	Lake Superior pig	1,500	Air furnace	5986
	Salisbury pig	6,000		
	Soft pig	10,000		
	Scrap	16,500		
	Total	34,000		

12-INCH SHOT AND SHELL.

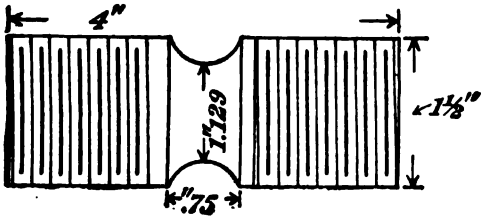
No. 6358.

Marks, 60.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 6″.

Applied loads		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000033	.000033	.....	.....	
3,000	3,000	.000100	.000067	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000233	.000083	.....	.....	
6,000	6,000	.000317	.000084	.....	.....	
7,000	7,000	.000383	.000066	.....	.....	
8,000	8,000	.000467	.000084	.....	.....	
9,000	9,000	.000533	.000066	.....	.....	
10,000	10,000	.000633	.000100	0.	.....	
11,000	11,000	.000700	.000067	.....	.....	
12,000	12,000	.000783	.000083	.....	.....	
13,000	13,000	.000850	.000067	.....	.....	
14,000	14,000	.000950	.000100	.....	.....	
15,000	15,000	.001033	.000083	.000050	.000050	
16,000	16,000	.001150	.000117	.....	.....	
17,000	17,000	.001300	.000150	.....	.....	
18,000	18,000	.001417	.000117	.....	.....	
19,000	19,000	.001583	.000166	.....	.....	
20,000	20,000	.001717	.000134	.000333	.000283	
21,000	21,000	.001933	.000216	.....	.....	
22,000	22,000	.002150	.000217	.....	.....	
23,000	23,000	.002367	.000217	.....	.....	
24,000	24,000	.002683	.000316	.....	.....	
25,000	25,000	.003000	.000317	.001050	.000717	
27,620	27,620	.....	.....	.....	.....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

Chemical Analyses and Tension Tests.



No. of test.	Description.	Date of cast.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
			Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.			
			Total.	Graphitic.	Combined.								
											Pounds.		
5692	3.″2 shell										23,520	Granular, gray	7.1430
5693	.....do										24,020	.....do	7.1982
5694	.....do										24,970	.....do	7.1610
5695	.....do										22,430	Granular, gray, mottled	7.1891
5704	.....do										25,690	Fine granular, gray	7.1490
5705	.....do										24,280	.....do	7.1420
5706	.....do										23,400	.....do	7.1141
5707	.....do										23,020	.....do	
5711	.....do		3.122	2.508	0.614	0.365	1.015	0.100	0.511		24,410	Granular, gray	7.1982
5712	3″ shell		3.318	2.699	0.619	0.400	0.940	0.076	0.501		26,890	Fine granular, light gray	7.1058
5713	.....do										22,000	Granular, gray	7.1648
5714	.....do										25,990	Fine granular, light gray	7.2170
5726	.....do										23,210	Granular, gray	7.1465
5729	.....do										25,300	.....do	7.1760
5731	.....do										22,020	Granular, gray, spongy side	7.1800
5732	.....do										27,300	Fine granular, gray	7.1366
5733	.....do										22,410	.....do	7.1126
5734	.....do										29,210	.....do	7.1670
5738	.....do										22,410	.....do	7.2085
5739	.....do										24,520	.....do	7.0815

CHEMICAL ANALYSES AND TENSION TESTS—Continued.

No. of test.	Description.	Date of cast.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
			Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.			
			Total.	Graphitic.	Combined.								
											Pounds.		
5741	8" shell		2.808	2.279	0.529	0.888	1.880	0.110	0.403		27,080	Fine granular, mottled	7.1745
5742	do										24,000	Fine granular, light gray	7.2111
5750	do										30,450	Granular, gray	7.1855
5753	do		3.070	2.405	0.665	0.375	2.162	0.110	0.403		27,950	Granular, light gray	7.1749
5754	do										28,080	do	7.1631
5757	do										27,200	do	7.2223
5758	do										29,300	Fine granular, light gray	7.1714
5763	do										28,400	Fine granular, gray	7.0968
5764	do										29,200	Fine granular, light gray	7.2770
5765	do										28,910	do	7.2254
5769	do										26,740	Fine granular, gray	7.1540
5772	do										27,500	do	7.1800
5778	do										21,950	Granular, gray	7.1062
5779	do										25,810	do	7.1429
5781	do										28,480	do	7.2288
5783	do										22,340	do	7.1945
5786	do										25,420	Granular, light gray	7.1933
5802	do										29,870	Fine granular, light gray	7.0804
5803	do										27,720	do	7.1561
5804	do										31,200	do	7.1359
5819	do										29,990	Fine granular, gray	7.2110
5755	6" shell										26,520	Granular, gray	7.1383
5760	do										31,980	Fine granular, gray	7.1651
5762	do										27,020	do	7.1677
5766	do										30,180	Fine granular, light gray, mottled	7.2902
5770	do										30,610	Fine granular, gray	7.1520
5771	do										36,550	Fine granular, light gray, mottled	7.2750
5782	do										29,010	Granular, gray	7.2207
5805	8", 10", and 12" shot										24,520	Fine granular, gray, mottled	7.1137
5810	do										25,300	Fine granular, gray	7.2518
5826	do										27,900	Fine granular, light gray, mottled	7.3446
5827	do										26,980	Fine granular, dark gray	7.1090
5833	do										28,900	Fine granular, mottled	7.2360
5834	do										26,850	Fine granular, light gray	7.2074
5838	do										26,320	Fine granular, light gray, mottled	7.0332
5841	do										27,200	Fine granular, light gray	7.1587
5842	do										31,280	do	7.2339

5843	.....do										27,150	Granular, gray	7.0673
5852	.....do										27,570	.....do	7.1223
5857	.....do										27,410	.....do	7.1849
5859	.....do										26,420	.....do	7.0933
5863	8", 10", 12" shot and 12" shell										28,460	.....do	7.1381
5865	.....do										24,380	.....do	7.0639
5873	8", 10", 12" shot and shell										28,120	.....do	7.1207
5874	.....do										27,400	.....do	7.1456
5875	.....do										26,540	.....do	7.0621
5876	.....do										25,100	.....do	7.1039
5877	.....do										26,740	.....do	7.1409
5879	.....do										26,660	.....do	7.1486
5883	.....do										31,040	Fine granular, light gray	7.2148
5887	.....do										26,420	Granular, gray	7.1095
5902	.....do										24,050	Medium coarse granular, mottled	7.0929
5903	.....do										22,300	Medium coarse granular, dark gray	7.1240
5904	.....do										27,250	Granular, gray	7.1941
5908	.....do										26,890	Granular, mottled	7.1845
5909	.....do										26,320	Granular, gray	7.0743
5910	.....do										25,490	.....do	7.0493
5911	.....do										26,120	Granular, dark gray	7.1158
5912	.....do										30,650	Fine granular, light gray	7.1297
5913	.....do										29,170	.....do	7.2279
5917	.....do										29,240	Fine granular, light gray, mottled	7.3399
5918	.....do										28,060	.....do	7.3026
5919	.....do										26,020	Fine granular, gray	7.3046
5921	.....do										27,790	Fine granular, light gray, mottled	7.1133
5922	.....do										29,240	.....do	7.1864
5923	10" and 12" shot and shell										29,200	.....do	7.3101
5924	.....do										27,980	.....do	7.0885
5926	.....do										31,970	Fine granular, light gray, mottled	7.2201
		1899.											
5929	12" shot and shell										34,820	Fine granular, light gray	7.1685
5930	.....do	Feb. 25									35,100	.....do	7.2901
5936	.....do	Feb. 21	2.568	1.985	0.628	0.250	1.170	0.085	0.440		34,700	.....do	7.2578
5937	.....do	Mar. 1									27,740	Fine granular, light gray, mottled	7.1317
5939	.....do	Mar. 9									35,300	Fine granular, light gray	7.2614
5940	.....do	Mar. 11									29,910	.....do	7.1295
5941	.....do	Mar. 14									28,200	.....do	7.2398
5943	.....do	Mar. 16									31,520	Fine granular, light gray, mottled	7.1805
5944	.....do	Mar. 3	3.212	2.836	0.376	0.475	1.144	0.155	0.374		27,720	Granular, mottled	7.1808
5945	.....do	Mar. 21									30,980	.....do	7.2873
5946	.....do	Mar. 25									32,600	Granular, gray	7.1737
5947	.....do	Mar. 29									30,400	.....do	7.1474
5948	.....do	Apr. 3									28,900	Fine granular, light gray, mottled	7.1621
5951	12" shot	Apr. 15									27,100	Fine granular, gray	7.1401
5953	12" shot and shell	Apr. 18									34,900	Fine granular, light gray	7.3148
5955	12" shell	Apr. 22									31,400	.....do	7.2197
5957	12" shot and shell	May 5									31,040	.....do	7.1741
5958	.....do	May 8									31,400	.....do	7.1956
5959	.....do	May 15									31,800	.....do	7.1874
5964	.....do	May 19									30,020	Fine granular, light gray, mottled	6.9253
5965	.....do	May 23									27,300	.....do	7.3239

CHEMICAL ANALYSES AND TENSION TESTS—Continued.

No. of test.	Description.	Date of cast.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
			Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.			
			Total.	Graphitic.	Combined.								
											Pounds.		
5966	12″ shot and shell	May 27									31,100	Fine granular, light gray	7.1519
5969	do	June 2	3.304	2.186	1.118	0.252	1.850	0.070	0.782		33,600	Fine granular, gray, mottled	7.2562
5971	do	June 8									24,300	Fine granular, light gray	7.2423
5980	do	June 14									30,860	do	7.1366
5981	do	June 17									28,340	Fine granular, gray, mottled	7.1143
5982	do	June 22									29,030	Fine granular, light gray	7.1587
5986	do	June 26									32,100	Fine granular, gray, mottled	7.1315
5691	Side frame 12″ disappearing carriage.										35,500	Granular, light gray	7.2330
5709	do										34,020	Granular, gray	7.2558
5725	do										33,040	Fine granular, gray	7.1447
5761	do										36,700	do	7.2319
5768	do										35,400	Fine granular, light gray	7.2747
5867	do										32,200	Fine granular, gray	7.1616
5926	do										31,970	Fine granular, light gray, mottled	7.2201
5956	do										33,750	Granular, gray	7.1821
5759	Lower roller path 12-inch disappearing carriage.										34,980	Fine granular, light gray	7.2584
5837	do										28,060	Fine granular, dark gray	7.1579
5915	do										29,990	Granular, gray	7.1025
5916	do										27,410	Fine granular, dark gray	7.1787
5697	10-inch top disappearing carriage.										34,050	Granular, gray	7.2269
5724	do										36,180	do	7.2162
5735	do										36,300	Fine granular, gray	7.1517
5780	do										30,300	Granular, gray	7.2157
5811	do										32,680	Fine granular, dark gray	
5846	do										22,590	Granular, mottled, light gray	7.1968
5851	do										33,020	Fine granular, light gray	7.1384
5945	do	Mar. 21									30,980	Granular, mottled	7.2873
5940	10-inch platform plate	Mar. 11									29,910	Fine granular, light gray	7.1295
5955	do	Apr. 22									31,400	do	7.2197
5767	Chassis, 8-inch barbette carriage.										33,510	Fine granular, light gray	7.1515
5880	6-inch disappearing carriage										30,980	Granular, light gray	7.1079

5890	.....do										30,650	Fine granular, light gray	7.1445
5899	.....do										32,850	Fine granular, gray	7.1633
5906	.....do										32,400	Fine granular, light gray	7.3096
5923	.....do										29,200	Fine granular, light gray, mottled	7.3101
5929	.....do										34,820	Fine granular, light gray	7.1685
5930	.....do	Feb. 25									35,100	.....do	7.2901
5934	.....do	Mar. 7	2.686	2.208	0.488	0.386	1.220	0.080	0.529		34,550	.....do	7.2051
5945	.....do	Mar. 21									30,980	Granular, mottled	7.2873
5946	.....do	Mar. 25									32,600	Granular, gray	7.1737
5947	.....do	Mar. 29									30,400	.....do	7.1474
5948	.....do	Apr. 8									28,900	Fine granular, light gray, mottled	
5955	.....do	Apr. 22									31,400	Fine granular, light gray	7.2197
5956	.....do	Apr. 27									29,860	.....do	7.0804
5957	.....do	May 5									31,040	.....do	
5958	.....do	May 8									31,400	.....do	
5959	.....do	May 15									31,800	.....do	
5964	.....do	May 19									30,020	Fine granular, light gray, mottled	6.9253
5965	.....do	May 23									27,300	.....do	7.3239
5966	.....do	May 27									31,100	Fine granular, light gray	7.1519
5969	.....do	June 2	3.304	2.186	1.118	0.252	1.850	0.070	0.782		33,600	Fine granular, gray, mottled	7.2562
5971	.....do	June 8									24,300	Fine granular, light gray	7.2423
5980	.....do	June 14									30,860	.....do	7.1366
5981	.....do	June 17									28,340	Fine granular, gray, mottled	7.1143
5982	.....do	June 22									29,030	Fine granular, light gray	
5986	.....do	June 26									32,100	Fine granular, gray, mottled	
5703	5-inch R. F. gun carriage										35,460	Fine granular, light gray	7.2584
5980	12-inch mortar top carriage	June 14									30,860	.....do	7.1366
5982	.....do	June 22									29,030	.....do	

CHEMICAL ANALYSES AND TENSION TESTS—Continued.

PIG IRONS.

No. of test.	Description.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
		Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.			
		Total.	Graphitic.	Combined.								
										Pounds.		
5816	Niagara malleable pig iron, No. 2	4.150	3.370	0.780	0.420	1.513	0.068	0.114	.....	25,260	Granular, with brilliant facets	.....
5817	Niagara malleable pig iron, No. 3	4.025	3.272	0.753	0.451	0.850	0.131	0.105	.....	14,210	Granular, varying in size, with brilliant facets.	.....
5818	Niagara malleable pig iron, No. 7	4.183	3.468	0.715	0.356	0.800	0.050	0.130	.....	15,490	Granular, with brilliant facets	.....
5861	Salisbury pig, No. 4	.....	.....	.....	.....	.....	.....	.....	.....	30,760	Fine and medium granulation interspersed, gray.	7.1738
5871	Salisbury carbonate pig	.....	.....	.....	.....	.....	.....	.....	.....	16,250	Medium fine granular, brilliant facets, gray.	7.0136
5882	....do	.....	.....	.....	.....	.....	.....	.....	.....	37,300	Fine granular, gray	7.2395
5927	Muirkirk pig	.....	.....	.....	.....	.....	.....	.....	.....	33,250	Fine granular, dark gray	7.1629
5928	....do	.....	.....	.....	.....	.....	.....	.....	.....	28,100	....do	6.5215
5869	Lake Superior pig	.....	.....	.....	.....	.....	.....	.....	.....	10,200	Coarse and fine granulation, brilliant facets, gray.	7.0260
5870	Lake Superior pig (charcoal)	.....	.....	.....	.....	.....	.....	.....	.....	32,400	Fine granular, gray	7.2160
5881	Lake Superior pig, No. 3	.....	.....	.....	.....	.....	.....	.....	.....	14,310	Medium and fine granulation interspersed.	7.1394
5942	Rebecca soft pig, No. 1	3.580	3.406	0.174	0.310	3.110	0.046	0.487	.....	12,300	Medium and fine granulation interspersed, bright facets.	6.8982
5884	Vulcan pig, No. 1	.....	.....	.....	.....	.....	.....	.....	.....	17,600	Coarse and fine granulation interspersed, brilliant facets.	6.9252
5970	Clifton pig, No. 1	3.206	3.176	0.030	1.200	3.400	0.020	0.619	.....	12,900	....do	6.9030

CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL.

TENSION TESTS.

No. of test.	Description.	Marks.	Tensile strength per square inch.	Fracture.
			Pounds.	
5698	3″.2 shell	8	26,340	Fine granular, gray.
5699	.....do	9	29,100	Do.
5700	.....do	10	29,340	Do.
5701	.....do	13	24,580	Do.
5702	.....do	14	28,050	Do.
5715	.....do	12	28,200	Do.
5716	.....do	15	26,990	Do.
5717	.....do	16	28,020	Do.
5718	.....do	21	26,980	Do.
5719	.....do	23	29,350	Do.
5720	10″ limited fire disappearing carriage.	17	31,010	Do.
5721	.....do	16	29,900	Do.
5722	10″ all round fire disappearing carriage.	18	30,580	Fine granular, light gray.
5727	.....do	19	29,710	Granular, gray.
5728	.....do	20	29,920	Do.
5736	.....do	21	29,420	Fine granular, gray.
5737	.....do	22	30,200	Do.
5949	.....do	.....	28,500	Do.
5751	.....do	23	28,380	Granular, gray.
5752	.....do	24	31,020	Do.
5756	.....do	25	31,900	Granular, light gray.
5801	.....do	28	31,990	Fine granular, light gray.
5743	3″.2 shell	24	27,800	Granular, gray.
5744	.....do	25	27,710	Do.
5745	.....do	26	28,180	Do.
5746	.....do	27	27,300	Do.
5747	.....do	28	27,870	Do.
5748	.....do	29	26,460	Do,
5773	.....do	30	28,970	Fine granular, gray.
5774	.....do	31	28,570	Do.
5775	.....do	32	29,450	Do.
5776	.....do	33	29,990	Do.
5777	.....do	34	27,610	Do.
5784	7″ shell and 10″ shot	7-1-25	25,900	Granular, gray.
5785	.....do	7-2-25	23,100	Granular, with coarse spangles, gray.
5787	.....do	R 7-41	26,080	Fine granular, gray.
5788	.....do	R 7-48	25,670	Do.
5789	.....do	R 7-61	27,610	Do.
5790	.....do	R 7-62	29,740	Fine granular, gray, mottled.
5791	.....do	R 7-63	25,930	Fine granular, gray.
5792	.....do	R 10-59	28,910	Fine granular, light gray, mottled.
5793	.....do	R 10-60	28,610	Do.
5794	.....do	R 10-61	30,220	Do.
5795	.....do	R 10-62	30,600	Do.
5796	.....do	R 10-63	27,860	Do.
5797	.....do	R 7-64	28,220	Fine granular, light gray.
5798	.....do	R 10-64	30,210	Fine granular, light gray, mottled.
5799	.....do	R 10-65	26,300	Do.
5800	.....do	R 10-66	26,590	Do.
5806	.....do	R 7-65	26,890	Fine granular, dark gray.
5807	.....do	R 7-66	25,720	Do.
5808	.....do	R 10-67	29,980	Fine granular, light gray, mottled.
5809	.....do	R 10-68	28,300	Do.
5812	.....do	R 7-67	24,420	Fine granular, gray.
5813	.....do	R 7-68	27,060	Fine granular, light gray.
5814	.....do	R 7-69	28,410	Fine granular, gray.
5815	.....do	R 10-69	28,900	Fine granular, mottled.
5822	.....do	R 7-70	27,490	Fine granular, gray.
5823	.....do	R 7-71	23,970	Do.
5824	.....do	R 10-70	29,860	Fine granular, mottled.
5825	.....do	R 10-71	28,620	Do.
5828	.....do	R 10-65 D	24,710	Fine granular, light gray, mottled.
5829	.....do	R 10-66 D	26,980	Do.
5830	.....do	R 7-67 D	25,210	Fine granular, dark gray.
5831	.....do	R 7-71 D	24,060	Fine granular, gray.
5835	10″ shot	R 10-79 D	28,520	Fine granular, mottled.
5848	Top carriage casting	T C C 123-1	27,980	Fine granular, light gray.
5849	.....do	T C C 123-2	26,510	Do.
5850	.....do	T C C 123-3	26,620	Do.
5854	Racer for gun carriage.	R 118 1 T 4-1	27,960	Fine granular, light gray.

CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL—Continued.

TENSION TESTS—Continued.

No. of test.	Description.	Marks.	Tensile strength per square inch.	Fracture.
			Pounds.	
5920	4" shell	Lot No. 1	15,800	Fine granular, dark gray.
5925	.....do	.....	18,900	Varies from fine to medium granular, dark gray.
5950	15-pounder common shell.	C L 1	21,050	Fine granular, dark gray.
5954	.....do	C L 2	24,850	Do.
5961	.....do	C L 3	23,200	Fine granular, gray.
5962	.....do	C L 4	24,350	Do.
5963	.....do	C L 5	18,300	Do.
5967	.....do	C L 7	22,050	Do.
5968	.....do	C L 8	23,550	Do.
5977	.....do	C L 9	24,400	Do.
5978	.....do	C L 10	23,050	Do.
5979	.....do	C L 11	26,550	Do.
5984	.....do	C L 12	26,050	Fine granular, dark gray.
5985	.....do	C L 13	26,550	Do.
5976	6-pounder common shell.	C L 1	21,600	Fine granular, gray.
5983	.....do	2 C L 1	22,350	Fine granular, dark gray.

STEEL

FOR

STANDARDIZING TESTING MACHINES.

SPECIMENS FROM AN ANNEALED BAR OF STEEL FOR STANDARDIZING TESTING MACHINE AT THE WORKS OF THE BENJAMIN ATHA AND ILLINGWORTH COMPANY, HARRISON, N. J.

No. 6001.

Marks, 1 W.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
8,000	40,000	.001300	.000300	.....	.....	
9,000	45,000	.001500	.000200	.....	.....	
10,000	50,000	.001650	.000150	.....	.....	
11,000	55,000	.001850	.000200	.....	.....	
12,000	60,000	.002050	.000200	.....	.....	
13,000	65,000	.002250	.000200	.....	.....	
13,200	66,000	.002300	.000050	.....	.....	
13,400	67,000	.002350	.000050	.....	.....	Elastic limit. Load fell.
12,400	62,000	.003650	.001300	.....	.....	
12,600	63,000	.005600	.001950	.....	.....	
12,800	64,000	.009000	.003400	.....	.....	
13,000	65,000	.012250	.003250	.....	.....	
13,200	66,000	.013650	.001400	.....	.....	
13,600	68,000	.016100	.002450	.....	.....	
14,000	70,000	.019000	.002900	.....	.....	
14,800	74,000	.025000	.006000	.....	.....	
15,600	78,000	.033000	.008000	.....	.....	
16,400	82,000	.043600	.010600	.....	.....	
17,200	86,000	.0600	.0164	.....	.....	
18,000	90,000	.1100	.0500	.....	.....	
18,040	90,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,200
Elastic limit per square inch of original section	do...	67,000
Elongation per inch after rupture	inch..	.2650
Elongation per inch under strain at elastic limit	do...	.002350
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture per cent of original section		57.2
Position of rupture		1".2 from neck
Character of broken surface		fine silky, cup shaped, serrated
Elongation of inch sections		".32*, ".21

No. 6002.

Marks, 3 W.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
8,000	40,000	.001400	.000400	.....	.....	
10,000	50,000	.001800	.000400	.....	.....	
11,000	55,000	.001950	.000150	.....	.....	
12,000	60,000	.002050	.000100	.....	.....	
12,200	61,000	.002100	.000050	.....	.....	
12,400	62,000	.002150	.000050	.....	.....	
12,600	63,000	.002200	.000050	.....	.....	Elastic limit.
12,800	64,000	.002350	.000150	.....	.....	
						Load fell.
12,200	61,000	.003400	.001050	.....	.....	
12,400	62,000	.004500	.001100	.....	.....	
12,600	63,000	.006250	.003750	.....	.....	
12,800	64,000	.013250	.005000	.....	.....	
13,000	65,000	.014300	.001050	.....	.....	
13,200	66,000	.015600	.001300	.....	.....	
13,600	68,000	.018450	.002850	.....	.....	
14,000	70,000	.021500	.003050	.....	.....	
14,800	74,000	.027750	.006250	.....	.....	
15,600	78,000	.035750	.008000	.....	.....	
16,400	82,000	.049500	.013750	.....	.....	
17,200	86,000	.0700	.0205	.....	.....	
17,960	89,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,800
Elastic limit per square inch of original section	do...	63,000
Elongation per inch after rupture	inch..	.2650
Elongation per inch under strain at elastic limit	do...	.002200
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		".9 from neck
Character of broken surface		fine silky, cup shaped, serrated
Elongation of inch sections		".14, ".39*

No. 6003.

Marks, 5 W.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	0.	.....	
8,000	40,000	.001350	.000350	.....	.....	
10,000	50,000	.001650	.000300	.....	.....	
11,000	55,000	.001850	.000200	.....	.....	
12,000	60,000	.002050	.000200	.....	.....	
12,200	61,000	.002050	0.	.....	.....	
12,400	62,000	.002100	.000050	.....	.....	
12,600	63,000	.002150	.000050	.....	.....	
12,800	64,000	.002150	0.	.....	.....	Elastic limit. Load fell.
12,200	61,000	.004400	.002250	.....	.....	
12,400	62,000	.006000	.001600	.....	.....	
12,600	63,000	.010000	.004000	.....	.....	
12,800	64,000	.012900	.002900	.....	.....	
13,000	65,000	.013950	.001050	.....	.....	
13,200	66,000	.015000	.001050	.....	.....	
13,600	68,000	.018050	.003050	.....	.....	
14,000	70,000	.022000	.003950	.....	.....	
14,800	74,000	.028500	.006500	.....	.....	
15,600	78,000	.038000	.009500	.....	.....	
16,400	82,000	.050000	.012000	.....	.....	
17,200	86,000	.0700	.0200	.....	.....	
17,800	89,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,000
Elastic limit per square inch of original section	do...	64,000
Elongation per inch after rupture	inch..	.2850
Elongation per inch under strain at elastic limit	do...	.002150
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		59.8
Position of rupture		1″.2 from neck
Character of broken surface		fine silky, cup shaped, serrated
Elongation of inch sections		″.22, ″.35*

No. 6004.

Marks, 7 W.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
8,000	40,000	.001400	.000400	.....	.....	
10,000	50,000	.001800	.000400	.....	.....	
11,000	55,000	.001950	.000150	.....	.....	
12,000	60,000	.002100	.000150	.....	.....	
12,200	61,000	.002200	.000100	.....	.....	
12,400	62,000	.002250	.000050	.....	.....	Elastic limit.
12,600	63,000	.002400	.000150	.....	.....	Load fell.
12,000	60,000	.006000	.003600	.....	.....	
12,200	61,000	.007500	.001500	.....	.....	
12,400	62,000	.011400	.003900	.....	.....	
12,600	63,000	.012100	.000700	.....	.....	
12,800	64,000	.013500	.001400	.....	.....	
13,000	65,000	.014150	.000650	.....	.....	
13,200	66,000	.015500	.001350	.....	.....	
13,600	68,000	.018100	.002600	.....	.....	
14,000	70,000	.021500	.003400	.....	.....	
14,800	74,000	.028100	.006600	.....	.....	
15,600	78,000	.035000	.006900	.....	.....	
16,400	82,000	.045000	.010000	.....	.....	
17,200	86,000	.0600	.0150	.....	.....	
18,000	90,000	.1000	.0400	.....	.....	
18,120	90,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,600
Elastic limit per square inch of original section	do...	62,000
Elongation per inch after rupture	inch..	.2550
Elongation per inch under strain at elastic limit	do...	.002250
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		".6 from neck
Character of broken surface		fine silky, cup shaped, serrated
Elongation of inch sections		".12, ".39*

No. 6005.

Marks, 9 W.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.000950	.000850	0.	.....	
8,000	40,000	.001800	.000850	.....	.....	
10,000	50,000	.001650	.000850	.....	.....	
11,000	55,000	.001800	.000150	.....	.....	
12,000	60,000	.001950	.000150	.....	.....	
12,200	61,000	.002000	.000050	.....	.....	
12,320	61,600	.....	.....	.....	.....	Elastic limit. Load fell.
12,000	60,000	.004700	.002700	.....	.....	
12,200	61,000	.007500	.002800	.....	.....	
12,400	62,000	.010250	.002750	.....	.....	
12,600	63,000	.011250	.001000	.....	.....	
12,800	64,000	.012650	.001400	.....	.....	
13,000	65,000	.013750	.001100	.....	.....	
13,200	66,000	.015000	.001250	.....	.....	
13,600	68,000	.017400	.002400	.....	.....	
14,000	70,000	.019500	.002100	.....	.....	
14,800	74,000	.026750	.007250	.....	.....	
15,600	78,000	.033600	.006850	.....	.....	
16,400	82,000	.042250	.008650	.....	.....	
17,200	86,000	.0550	.012750	.....	.....	
18,000	90,000	.0800	.0250	.....	.....	
18,380	91,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,900
Elastic limit per square inch of original section	do...	61,600
Elongation per inch after rupture	inch..	.2600
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		1″ from neck
Character of broken surface		fine silky, cup shaped, serrated
Elongation of inch sections		″.15, ″.37*

Steel Specimens for Standardizing Testing Machine at Works of The Taylor Iron and Steel Company, High Bridge, N. J.

No. 6024.

Marks, 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001450	.000450	0.	.....	
9,000	45,000	.001650	.000200	.....	.....	
9,200	46,000	.001700	.000050	.....	.....	Elastic limit.
9,400	47,000	.001900	.000200	.....	.....	
		.006250	.004350	.....	.....	
9,600	48,000	.007500	.001250	.....	.....	
9,800	49,000	.008150	.000650	.....	.....	
10,000	50,000	.008950	.000800	.....	.....	
10,200	51,000	.009900	.000950	.....	.....	
18,720	93,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	93,600
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		".9 from neck
Character of broken surface		silky
Elongation of inch sections		".14, ".32

No. 6025.

Marks, 2.
Diameter ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001450	.000450	0.	.....	
9,000	45,000	.001650	.000200	.....	.....	
9,200	46,000	.001700	.000050	.....	.....	
9,400	47,000	.001750	.000050	.....	.....	
9,600	48,000	.001850	.000100	.....	.....	Elastic limit.
9,800	49,000	.008500	.006650	.....	.....	
10,000	50,000	.009500	.001000	.....	.....	
10,200	51,000	.009900	.000400	.....	.....	
10,400	52,000	.010250	.000350	.....	.....	
10,600	53,000	.010550	.000300	.....	.....	
18,820	94,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,100
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".2 from neck
Character of broken surface		silky
Elongation of inch sections		".28*, ".20

No. 6026.

Marks, 3.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001400	.000400	0.	.....	
9,000	45,000	.001600	.000200	.....	.....	Elastic limit.
9,200	46,000	.006000	.004400	.....	.....	
9,400	47,000	.006750	.000750	.....	.....	
9,600	48,000	.007450	.000700	.....	.....	
9,800	49,000	.008150	.000700	.....	.....	
10,000	50,000	.009150	.001000	.....	.....	
18,650	93,250	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	93,250
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1".1 from neck
Character of broken surface		silky
Elongation of inch sections		".26*, ".22

No. 6027.

Marks, 4.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000700	.000300	.....	.....	
6,000	30,000	.001050	.000350	.....	.....	
8,000	40,000	.001450	.000400	0.	.....	
8,600	43,000	.001700	.000250	.....	.....	
8,800	44,000	.001850	.000150	.....	.....	
9,000	45,000	.001900	.000050	.....	.....	
9,200	46,000	.006750	.004850	.....	.....	Elastic limit.
9,400	47,000	.007100	.000350	.....	.....	
9,600	48,000	.007900	.000800	.....	.....	
9,800	49,000	.008650	.000750	.....	.....	
10,000	50,000	.009500	.000850	.....	.....	
18,490	92,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,450
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2450
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1".2 from neck
Character of broken surface		silky
Elongation of inch sections		".28*, ".21

No. 6028.

Marks, 5.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001050	.000400	.....	.....	
7,600	38,000	.001400	.000350	.....	.....	Elastic limit.
7,800	39,000	.001800	.000400	.....	.....	
8,000	40,000	.002400	.000600	.....	.....	
8,200	41,000	.003900	.001500	.....	.....	
8,400	42,000	.004550	.000650	.....	.....	
8,600	43,000	.005400	.000850	.....	.....	
8,800	44,000	.006050	.000650	.....	.....	
17,880	89,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,150
Elastic limit per square inch of original section	do. .	38,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do. .	.001400
Reduction in diameter at point of rupture	do. .	.115
Reduction in area after rupture, per cent of original section		10.3
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".24", ".21

No. 6029.

Marks, 6.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001400	.000400	.....	.....	
9,200	46,000	.001650	.000250	.....	.....	
9,400	47,000	.001750	.000100	.....	.....	Elastic limit.
9,600	48,000	.008500	.006750	.....	.....	
9,800	49,000	.009500	.001000	.....	.....	
10,000	50,000	.010050	.000550	.....	.....	
10,200	51,000	.010750	.000700	.....	.....	
10,400	52,000	.011750	.001000	.....	.....	
18,300	91,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,500
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2600
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.28*, ″.24*

No. 6030.

Marks, 7.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,600	38,000	.001400	.000400	.....	.....	Elastic limit.
7,800	39,000	.001700	.000300	.....	.....	
8,000	40,000	.003650	.001950	.....	.....	
8,200	41,000	.005500	.001850	.....	.....	
8,400	42,000	.006400	.000900	.....	.....	
8,600	43,000	.007000	.000600	.....	.....	
8,800	44,000	.008100	.001100	.....	.....	
17,320	86,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,600
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.2500
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".27*, ".23*

No. 6031.

Marks, 8.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000350	.000200	.....	.....	
4,000	20,000	.000700	.000350	.....	.....	
6,000	30,000	.001000	.000300	.....	.....	
8,000	40,000	.001450	.000450	0.	.....	
9,000	45,000	.001750	.000300	.....	.....	Elastic limit.
9,200	46,000	.001900	.000150	.....	.....	
9,400	47,000	.007750	.005850	.....	.....	
9,600	48,000	.008500	.000750	.....	.....	
9,800	49,000	.009100	.000600	.....	.....	
10,000	50,000	.009900	.000800	.....	.....	
18,460	92,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,300
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2350
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		".75 from neck
Character of broken surface		silky
Elongation of inch sections		".16, ".31*

No. 6032.

g. 9.
ter, ".505.
al area, .20 square inch.
l length, 2".

ed loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
al. Pounds.	Inch.	Inch.	Inch.	Inch.	
200	0.	0.	0.	0.	Initial load.
1,000	.000100	.000100	0.	.....	
2,000	.000300	.000200	.....	.....	
4,000	.000600	.000300	.....	.....	
6,000	.001000	.000400	.....	.....	
8,000	.001450	.000450	.000050	.000050	
8,200	.001500	.000050	.....	.....	
8,400	.001550	.000050	.....	.....	
8,600	.001650	.000100	.....	.....	Elastic limit.
8,800	.001800	.000150	.....	.....	
9,000	.004250	.002450	.....	.....	
9,200	.005900	.001650	.....	.....	
9,400	.006500	.000600	.....	.....	
9,600	.007500	.001000	.....	.....	
18,810					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,050
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.00165
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		".75 from neck
Character of broken surface		silky
Elongation of inch sections		".30", ".15

No. 6033.

Marks, 10.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
8,000	40,000	.001350	.000350	0.	.....	
10,000	50,000	.001650	.000300	.....	.....	
10,200	51,000	.001700	.000050	.....	.....	Elastic limit.
10,400	52,000	.011250	.009550	.....	.....	
10,600	53,000	.011650	.000400	.....	.....	
10,800	54,000	.012100	.000450	.....	.....	
11,000	55,000	.013000	.000900	.....	.....	
11,200	56,000	.014250	.001250	.....	.....	
18,540	92,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,700
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2500
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".30*, ".20

TABULATION OF TENSION TESTS OF STEEL SPECIMENS FOR STANDARDIZING PRIVATE TESTING MACHINES.

No. of test.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 2 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	Remarks.
				Total.	Per square inch.	Total.	Per square inch.							
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	*In. Sq. in.*	*Per ct.*			
6001	1 W.....	.505	.20	13,400	67,000	18,040	90,200	.53	26.5	Diam...33=.0856	57.2	Fine silky, cup shaped, serrated.	″.32*, ″.21	From an annealed bar of steel.
6002	3 W.....	.505	.20	12,600	63,000	17,960	89,800	.53	26.5	Diam...33=.0855	57.2	.....do.....	.14, .39*	
6003	5 W.....	.505	.20	12,800	64,000	17,800	89,000	.57	28.5	Diam...32=.0804	59.8	.....do.....	.22, .35*	
6004	7 W.....	.505	.20	12,400	62,000	18,120	90,600	.51	25.5	Diam...33=.0855	57.2	.....do.....	.12, .39*	
6005	9 W.....	.505	.20	12,320	61,600	18,380	91,900	.52	26.0	Diam...33=.0855	57.2	.....do.....	.15, .37*	
6024	1.....	.505	.20	9,200	46,000	18,720	93,600	.46	23.0	Diam...39=.1194	40.3	Silky.....	.14, .32*	
6025	2.....	.505	.20	9,600	48,000	18,820	94,100	.48	24.0	Diam...39=.1194	40.3	.....do.....	.28*, .20	
6026	3.....	.505	.20	9,000	45,000	18,650	93,250	.48	24.0	Diam...39=.1194	40.3	.....do.....	.26*, .22	
6027	4.....	.505	.20	9,000	45,000	18,490	92,450	.49	24.5	Diam...40=.1257	37.1	.....do.....	.28*, .21	
6028	5.....	.505	.20	7,600	38,000	17,830	89,150	.45	22.5	Diam...39=.1194	40.3	.....do.....	.24*, .21	
6029	6.....	.505	.20	9,400	47,000	18,300	91,500	.52	26.0	Diam...39=.1194	40.3	.....do.....	.28*, .24	
6030	7.....	.505	.20	7,600	38,000	17,320	86,600	.50	25.0	Diam...38=.1134	43.3	.....do.....	.27*, .23	
6031	8.....	.505	.20	9,000	45,000	18,460	92,300	.47	23.5	Diam...39=.1194	40.3	.....do.....	.16, .31*	
6032	9.....	.505	.20	8,600	43,000	18,810	94,050	.45	22.5	Diam...39=.1194	40.3	.....do.....	.30*, .15	
6033	10.....	.505	.20	10,200	51,000	18,540	92,700	.50	25.0	Diam...38=.1134	43.3	.....do.....	.30*, .20	

STEEL BARS

FOR

STANDARDIZING TESTING MACHINE AT WATERVLIET ARSENAL.

No. 6131.

Marks, T M 2.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000800	.000200	.....	.....	
5,000	20,000	.000800	.000800	.....	.....	
6,250	25,000	.000800	.000200	.....	.....	
7,500	30,000	.001050	.000250	.000050	.000050	
8,750	35,000	.001200	.000150	.....	.....	
10,000	40,000	.001350	.000150	.....	.....	Elastic limit.
10,250	41,000	.002750	.001400	.....	.....	
		.022000	.019250	.....	.....	
10,500	42,000	.025150	.003150	.....	.....	
10,750	43,000	.026900	.001750	.....	.....	
11,000	44,000	.028250	.001350	.....	.....	
11,500	46,000	.035250	.007000	.....	.....	
12,000	48,000	.042250	.007000	.....	.....	
12,500	50,000	.048600	.006350	.....	.....	
13,000	52,000	.055500	.006900	.....	.....	
13,500	54,000	.064000	.008500	.....	.....	
14,000	56,000	.077000	.013000	.....	.....	
14,500	58,000	.092250	.015250	.....	.....	
15,000	60,000	.115000	.022750	.....	.....	
15,500	62,000	.1700	.0550	.....	.....	
15,710	62,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	62,840
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.3650
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.214
Reduction in area after rupture, per cent of original section		61.5
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".35*, ".38*

No. 6132.

Marks, T M 4.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000650	.000350	.....	.....	
7,500	30,000	.001100	.000450	0.	.....	
8,750	35,000	.001200	.000100	.....	.....	
10,000	40,000	.001300	.000100	.....	.....	
10,250	41,000	.001350	.000050	.....	.....	
10,500	42,000	.001450	.000100	.....	.....	
10,750	43,000	.001550	.000100	.....	.....	
11,000	44,000	.001600	.000050	.....	.....	Elastic limit.
		.030900	.029300	.....	.....	
11,250	45,000	.031450	.000550	.....	.....	
11,500	46,000	.033000	.001550	.....	.....	
11,750	47,000	.036000	.003000	.....	.....	
12,000	48,000	.039750	.003750	.....	.....	
12,500	50,000	.048000	.008250	.....	.....	
13,000	52,000	.059750	.011750	.....	.....	
13,500	54,000	.064500	.004750	.....	.....	
14,000	56,000	.076900	.012400	.....	.....	
14,500	58,000	.092500	.015600	.....	.....	
15,000	60,000	.1150	.0225	.....	.....	
15,500	62,000	.1600	.0450	.....	.....	
15,710	62,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	62,840
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.3650
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.214
Reduction in area after rupture, per cent of original section		61.5
Position of rupture		1".3 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".44*, ".29

No. 6133.

Marks, T.M–6.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000350	.000250	.....	.....	
5,000	20,000	.000650	.000300	.....	.....	
7,500	30,000	.001050	.000400	0.	.....	
8,750	35,000	.001200	.000150	.....	.....	
10,000	40,000	.001400	.000200	.....	.....	
10,250	41,000	.001450	.000050	.....	.....	
10,500	42,000	.001450	0.	.....	.....	
10,750	43,000	.001500	.000050	.....	.....	Elastic limit.
		.025900	.024400	.....	.....	
11,000	44,000	.028250	.002350	.....	.....	
11,250	45,000	.030000	.001750	.....	.....	
11,500	46,000	.034250	.004250	.....	.....	
11,750	47,000	.036100	.001850	.....	.....	
12,000	48,000	.040000	.003900	.....	.....	
12,500	50,000	.045500	.005500	.....	.....	
13,000	52,000	.054000	.008500	.....	.....	
13,500	54,000	.063000	.009000	.....	.....	
14,000	56,000	.075500	.012500	.....	.....	
14,500	58,000	.091500	.016000	.....	.....	
15,000	60,000	.113500	.022000	.....	.....	
15,500	62,000	.1550	.0415	.....	.....	
15,660	62,640	.....	.....	.....	.....	Tensile strength.

General summary.

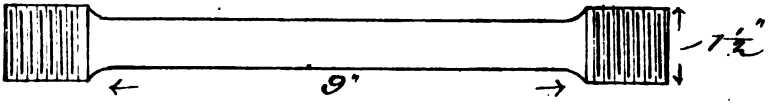
Tensile strength per square inch of original section	pounds..	62,640
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.3650
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.214
Reduction in area after rupture, per cent of original section		61.5
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".38*, ".35*

STEEL BARS.

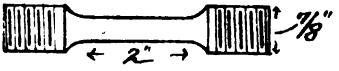
NICKEL AND CARBON STEEL.

Forms of specimens.

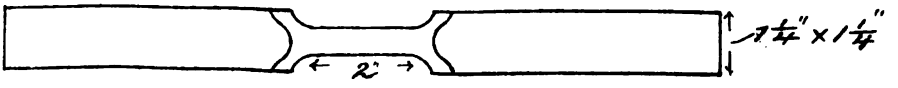
Nos 6141 - 6146.



Nos. 9542 - 9545.



Nos. 9546 and 9547.



Specimens marked A 1 and A 2, and 1 A and 2 A are nickel steel annealed, those marked T 1 and T 2, and 1 E and 2 E are nickel steel tempered and annealed.

Specimens marked E–15–1 and E–15–2 are made from axle steel containing .44 per cent carbon.

The chemical analysis of the nickel steel, specimens 6141 to 6144, inclusive, and 9542 to 9545, inclusive, was as follows:

	Per cent.
Carbon	.30
Manganese	.73
Silicon	.203
Sulphur	.035
Phosphorus	.027
Copper	.035
Nickel	3.375

No. 6141.

Marks, A 1.
Diameter, 1″.007.
Sectional area, .7964 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
796	1,000	0.	0.	0.	0.	Initial load.
3,982	5,000	.00010	.00010			
7,964	10,000	.00024	.00014			
15,928	20,000	.00056	.00032			
23,892	30,000	.00092	.00036	−.00002	−.00002	
27,874	35,000	.00110	.00018			
31,856	40,000	.00126	.00016			
35,838	45,000	.00144	.00018			
39,820	50,000	.00162	.00018			
40,616	51,000	.00166	.00004			
41,413	52,000	.00172	.00006			
42,209	53,000	.00176	.00004			
43,006	54,000	.00182	.00006			
43,400	54,500					Elastic limit.
43,802	55,000	.0120	.01018			
44,598	56,000	.0140	.0020			
46,191	58,000	.0160	.0020			
47,784	60,000	.0180	.0020			
49,377	62,000	.0200	.0020			
50,970	64,000	.0240	.0040			
52,562	66,000	.0260	.0020			
54,155	68,000	.0280	.0020			
55,748	70,000	.0320	.0040			
57,341	72,000	.0360	.0040			
58,934	74,000	.0400	.0040			
60,526	76,000	.0440	.0040			
62,119	78,000	.0520	.0080			
63,712	80,000	.0580	.0060			
65,305	82,000	.0660	.0080			
66,898	84,000	.0760	.0100			
68,490	86,000	.0920	.0160			
70,083	88,000	.1220	.0300			
70,380	88,370	.1420	.0200			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,370
Elastic limit per square inch of original section	do...	54,500
Elongation per inch after rupture (in 9 inches)	inch..	.209
Reduction in diameter at point of rupture	do...	.1164
Reduction in area after rupture, per cent of original section		54.4
Position of rupture		3″.8 from neck
Character of broken surface		fine silky, cup-shaped
Elongation of inch sections		″.12, ″.15, ″.16, ″.19, ″.20, ″.48*, ″.33, ″.14, ″.11

No. 6142.

Marks, A–2.
Diameter, 1″.007.
Sectional area, .7964 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
796	1,000	0.	0.	0.	0.	Initial load.
3,982	5,000	.00012	.00012	.....	.....	
7,964	10,000	.00028	.00016	.....	.....	
15,928	20,000	.00062	.00034	.....	.....	
23,892	30,000	.00098	.00036	− .00004	− .00004	
27,874	35,000	.00114	.00016	.....	.....	
31,856	40,000	.00132	.00018	.....	.....	
35,838	45,000	.00150	.00018	.....	.....	
39,820	50,000	.00168	.00018	− .00004	0.	
40,616	51,000	.00172	.00004	.....	.....	
41,413	52,000	.00174	.00002	.....	.....	
42,209	53,000	.00178	.00004	.....	.....	
43,006	54,000	.00182	.00004	.....	.....	
43,802	55,000	.00188	.00006	.....	.....	
44,598	56,000	.00194	.00006	.....	.....	Elastic limit.
		.0120	.00006	.....	.....	
46,191	58,000	.0140	.0020	.....	.....	
47,784	60,000	.0180	.0040	.....	.....	
49,377	62,000	.0200	.0020	.....	.....	
50,970	64,000	.0240	.0040	.....	.....	
52,562	66,000	.0260	.0020	.....	.....	
54,155	68,000	.0280	.0020	.....	.....	
55,748	70,000	.0320	.0040	.....	.....	
57,341	72,000	.0360	.0040	.....	.....	
58,934	74,000	.0400	.0040	.....	.....	
60,526	76,000	.0440	.0040	.....	.....	
62,119	78,000	.0500	.0060	.....	.....	
63,712	80,000	.0560	.0060	.....	.....	
65,305	82,000	.0640	.0080	.....	.....	
66,898	84,000	.0740	.0100	.....	.....	
68,490	86,000	.0880	.0140	.....	.....	
70,083	88,000	.1180	.0300	.....	.....	
70,800	88,900	.1580	.0400	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,900
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture (in 9 inches)	inch..	.210
Elongation per inch under strain at elastic limit	do...	.00194
Reduction in diameter at point of rupture	do...	.1164
Reduction in area after rupture, per cent of original section		54.4
Position of rupture		3″.8 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.12, ″.17, ″.35, ″.45, ″.19, ″.17, ″.17, ″.15, ″.12

No. 6143.

Marks, T 1.
Diameter, 1".005.
Sectional area, .7933 square inch.
Gauged length, 5".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
793	1,000	0.	0.	0.	0.	Initial load.
3,966	5,000	.00016	.00016	0.	.....	
7,933	10,000	.00032	.00016	.....	.....	
15,866	20,000	.00068	.00036	.....	.....	
23,799	30,000	.00104	.00036	0.	.....	
27,765	35,000	.00118	.00014	.....	.....	
31,732	40,000	.00136	.00018	.....	.....	
35,698	45,000	.00154	.00018	.....	.....	
39,665	50,000	.00172	.00018	0.	.....	
40,458	51,000	.00176	.00004	.....	.....	
41,251	52,000	.00180	.00004	.....	.....	
42,045	53,000	.00184	.00004	.....	.....	
42,838	54,000	.00186	.00002	.....	.....	
43,632	55,000	.00188	.00002	.....	.....	
44,425	56,000	.00192	.00004	.....	.....	
45,218	57,000	.00196	.00004	.....	.....	
46,011	58,000	.00198	.00002	.....	.....	
46,805	59,000	.00202	.00004	.....	.....	
47,598	60,000	.00206	.00004	0.	.....	
48,391	61,000	.00210	.00004	.....	.....	
49,184	62,000	.00214	.00004	.....	.....	
49,978	63,000	.00218	.00004	.....	.....	
50,771	64,000	.00222	.00004	0.	.....	
55,531	70,000	.0040	.00178	.....	.....	
57,980	73,090	.....	.....	.....	.....	Elastic limit.
58,704	74,000	.0220	.0180	.....	.....	
60,291	76,000	.0260	.0040	.....	.....	
61,877	78,000	.0300	.0040	.....	.....	
63,464	80,000	.0320	.0020	.....	.....	
66,637	84,000	.0400	.0080	.....	.....	
69,810	88,000	.0520	.0120	.....	.....	
72,984	92,000	.0660	.0140	.....	.....	
76,157	96,000	.1020	.0360	.....	.....	
77,180	97,290	.1440	.0420	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,290
Elastic limit per square inch of original section	do...	73,090
Elongation per inch after rupture (in 9 inches)	inch..	.186
Reduction in diameter at point of rupture	do...	.345
Reduction in area after rupture, per cent of original section		56.9
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".09, ".10, ".12, ".16, ".57*, ".23, ".16, ".14, ".10

No. 6144.

Marks, T 2.
Diameter, 1″.005.
Sectional area, .7933 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
793	1,000	0.	0.	0.	0.	Initial load.
3,966	5,000	.00014	.00014	0.	.....	
7,933	10,000	.00032	.00018	.....	.....	
15,866	20,000	.00066	.00034	.....	.....	
23,799	30,000	.00102	.00036	0.	.....	
31,732	40,000	.00136	.00034	.....	.....	
39,665	50,000	.00168	.00032	.....	.....	
47,598	60,000	.00204	.00036	.....	.....	
50,771	64,000	.00218	.00014	0.	.....	
55,531	70,000	.0040	.00182	.....	.....	Elastic limit.
		.0200	.00160	.....	.....	
57,118	72,000	.0220	.0020	.....	.....	
58,704	74,000	.0240	.0020	.....	.....	
60,291	76,000	.0280	.0040	.....	.....	
61,877	78,000	.0320	.0040	.....	.....	
63,464	80,000	.0360	.0040	.....	.....	
66,637	84,000	.0440	.0080	.....	.....	
69,810	88,000	.0560	.0120	.....	.....	
72,984	92,000	.0760	.0200	.....	.....	
76,157	96,000	.1300	.0540	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,000
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.182
Elongation per inch under strain at elastic limit	do...	.0040
Reduction in diameter at point of rupture	do...	.335
Reduction in area after rupture, per cent of original section		55.6
Position of rupture		″.5 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.09, ″.12, ″.13, ″.15, ″.48*, ″.30, ″.14, ″.13, ″.10

No. 6145.

Marks, E–15–1.
Diameter, ″.996.
Sectional area, .779 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
779	1,000	0.	0.	0.	0.	Initial load.
3,895	5,000	.00016	.00016	.....	.....	
7,790	10,000	.00032	.00016	.....	.....	
15,580	20,000	.00068	.00036	.....	.....	
23,370	30,000	.00104	.00036	.00004	.00004	
24,149	31,000	.00108	.00004	.....	.....	
24,928	32,000	.00116	.00008	.....	.....	Elastic limit.
25,707	33,000	.0080	.00684	.....	.....	
27,265	35,000	.0100	.0020	.....	.....	
29,602	38,000	.0120	.0020	.....	.....	
31,160	40,000	.0140	.0020	.....	.....	
35,055	45,000	.0180	.0040	.....	.....	
38,950	50,000	.0240	.0060	.....	.....	
42,845	55,000	.0320	.0080	.....	.....	
46,740	60,000	.0400	.0080	.....	.....	
50,635	65,000	.0540	.0140	.....	.....	
54,530	70,000	.0760	.0220	.....	.....	
58,425	75,000	.1220	.0460	.....	.....	
59,240	76,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	76,050
Elastic limit per square inch of original section	do...	32,000
Elongation per inch after rupture (in 9 inches)	inch..	.208
Elongation per inch under strain at elastic limit	do...	.00116
Reduction in diameter at point of rupture	do...	.216
Reduction in area after rupture, per cent of original section		38.6
Position of rupture		3″.6 from neck
Character of broken surface		silky 40 per cent, granular 60 per cent
Elongation of inch sections		″.17, ″.23, ″.45*, ″.29, ″.19, ″.17, ″.14, ″.12, ″.11

No. 6146.

Marks, E–15–2.
Diameter, ″.998.
Sectional area, .782 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
782	1,000	0.	0.	0.	0.	Initial load.
3,910	5,000	.00016	.00016	0.	.....	
7,820	10,000	.00032	.00016	.....	.....	
15,640	20,000	.00068	.00036	.....	.....	
23,460	30,000	.00102	.00034	0.	.....	
24,100	30,820	.....	.....	.....	.....	Elastic limit.
24,242	31,000	.00270	.00168	.....	.....	
25,024	32,000	.0080	.0053	.....	.....	
27,370	35,000	.0100	.0020	.....	.....	
28,934	37,000	.0120	.0020	.....	.....	
31,280	40,000	.0160	.0040	.....	.....	
35,190	45,000	.0200	.0040	.....	.....	
39,100	50,000	.0280	.0080	.....	.....	
43,010	55,000	.0360	.0080	.....	.....	
46,920	60,000	.0500	.0140	.....	.....	
50,830	65,000	.0680	.0180	.....	.....	
54,740	70,000	.1020	.0340	.....	.....	
56,910	72,770	.1760	.0740	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,770
Elastic limit per square inch of original section	do...	30,820
Elongation per inch after rupture	inch..	.210
Reduction in diameter at point of rupture	do...	.248
Reduction in area after rupture, per cent of original section		43.5
Position of rupture		2″.3 from neck
Character of broken surface		silky
Elongation of inch sections		″.13, ″.17, ″.16, ″.15, ″.17, ″.17, ″.26, ″.49*, ″.19

TABULATION OF TENSION TESTS OF NICKEL AND CARBON STEEL FROM PENNSYLVANIA RAILROAD COMPANY.

No. of test.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 9 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
				Total.	Per square inch.	Total.	Per square inch.						
		Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*In. Sq. in.*	*Per ct.*		" " " " " " " " "
6141	A-1	1.007	.7964	43,400	44,500	70,380	88,370	1.88	20.9	Diam.. .68=.3632	54.4	Fine silky, cup shaped	.12, .15, .16, .19, .20, .48*, .33, .14, .11.
6142	A-2	1.007	.7964	44,598	56,000	70,800	88,900	1.89	21.0	Diam.. .68=.3632	54.4	do	.12, .17, .35, .45*, .19, .17, .17, .15, .12.
6143	T-1	1.005	.7933	57,980	73,090	77,180	97,290	1.67	18.6	Diam.. .66=.3421	56.9	do	.09, .10, .12, .16, .57*, .23, .16, .14, .10.
6144	T-2	1.005	.7933	55,531	70,000	76,157	96,000	1.64	18.2	Diam.. .67=.3526	55.6	do	.09, .12, .13, .15, .48*, .30, .14, .13, .10,
6145	E-15-1	.996	.779	24,928	32,000	59,240	76,050	1.87	20.8	Diam.. .78=.478	38.6	Silky 40 per cent, granular 60 per cent.	.17, .23, .45*, .29, .19, .17, .14, .12, .11.
6146	E-15-2	.998	.782	24,100	30,820	56,910	72,770	1.89	21.0	Diam.. .75=.442	43.5	Silky	.13, .17, .16, .15, .17, .17, .26, .49*, .19.
								Elongation in 2 inches.					
								Inch.	*Per ct.*				
9542	1-A	.515	.208	11,920	57,310	19,070	91,680	.53	26.5	Diam.. .34=.091	56.2	Silky, cup shaped	.25, .28*.
9544	2-A	.516	.209	11,600	55,500	18,910	90,480	.53	26.5	Diam.. .34=.091	56.5	do	.26, .27*.
9543	1-E	.516	.209	15,510	74,210	21,060	100,770	.46	23.0	Diam.. .33=.086	58.9	Fine silky, cup shaped	.10, .36*.
9545	2-E	.520	.212	15,610	73,630	21,500	101,410	.48	24.0	Diam.. .33=.086	59.4	do	.14, .34*.
9546	E-15-1	.508	.203	.....	.....	16,040	79,010	.48	24.0	Diam.. .39=.119	41.4	Silky	
9547	E-15-2	.513	.207	.....	.....	15,460	74,690	.55	27.5	Diam.. .38=.113	45.4	do	

STEEL BARS

FOR

ORDNANCE MATERIAL.

681

No. 6111.

Marks, D.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000450	.000350	.....	.....	
4,000	20,000	.000650	.000200	.....	.....	
6,000	30,000	.000950	.000300	.....	.....	
8,000	40,000	.001300	.000350	.....	.....	
10,000	50,000	.001650	.000350	0.	.....	
11,400	57,000	.001950	.000800	.....	.....	Elastic limit.
						Load fell.
10,400	52,000	.003400	.001450	.....	.....	
10,600	53,000	.004150	.000750	.....	.....	
10,800	54,000	.006750	.004600	.....	.....	
11,000	55,000	.013750	.005000	.....	.....	
11,200	56,000	.014400	.000650	.....	.....	
11,600	58,000	.016550	.002150	.....	.....	
12,000	60,000	.018000	.001450	.....	.....	
12,800	64,000	.023000	.005000	.....	.....	
13,600	68,000	.028600	.005600	.....	.....	
14,400	72,000	.034500	.005900	.....	.....	
15,200	76,000	.043000	.008500	.....	.....	
16,000	80,000	.053000	.010000	.....	.....	
16,800	84,000	.0750	.0220	.....	.....	
17,600	88,000	.1000	.0250	.....	.....	
18,090	90,450	.1550	.0550	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,450
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.2700
Elongation per inch under strain at elastic limit	do...	.001950
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		".9 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".16, ".38*

No. 6112.

Marks, H.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000650	.000250	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001300	.000300	.....	.....	
10,000	50,000	.001600	.000300	0.	.....	
11,400	57,000	.001950	.000350	.....	.....	Elastic limit.
						Load fell.
10,400	52,000	.008400	.001450	.....	.....	
10,600	53,000	.012000	.008600	.....	.....	
10,800	54,000	.013100	.001100	.....	.....	
11,000	55,000	.013500	.000400	.....	.....	
11,200	56,000	.014050	.000550	.....	.....	
11,600	58,000	.016100	.002050	.....	.....	
12,000	60,000	.018400	.002300	.....	.....	
12,800	64,000	.023150	.004750	.....	.....	
13,600	68,000	.029000	.005850	.....	.....	
14,400	72,000	.036000	.007000	.....	.....	
15,200	76,000	.043550	.007550	.....	.....	
16,000	80,000	.055900	.012350	.....	.....	
16,800	84,000	.070000	.014100	.....	.....	
17,600	88,000	.1000	.0300	.....	.....	
18,070	90,350	.1650	.0650	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,350
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.2800
Elongation per inch under strain at elastic limit	do...	.001950
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1".10 from neck
Character of broken surface		fine silky
Elongation of inch sections		".19, ".37*

No. 6113.

Marks, L.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
8,000	40,000	.001250	.000300	.....	.....	
10,000	50,000	.001600	.000350	0.	.....	
11,000	55,000	.001800	.000200	.....	.....	Elastic limit.
						Load fell.
10,200	51,000	.003250	.001450	.....	.....	
10,400	52,000	.003650	.000400	.....	.....	
10,600	53,000	.007000	.003350	.....	.....	
10,800	54,000	.013500	.006500	.....	.....	
11,200	56,000	.014400	.000900	.....	.....	
11,600	58,000	.016700	.002300	.....	.....	
12,000	60,000	.018500	.001800	.....	.....	
12,800	64,000	.023750	.005250	.....	.....	
13,600	68,000	.029500	.005750	.....	.....	
14,400	72,000	.034900	.005400	.....	.....	
15,200	76,000	.045250	.010350	.....	.....	
16,000	80,000	.055500	.010250	.....	.....	
16,800	84,000	.0750	.0195	.....	.....	
17,600	88,000	.1000	.0250	.....	.....	
18,010	90,050	.1700	.0700	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,050
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2950
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".29*, ".30*

Steel for Carrier Rings.

Mark on specimen.	Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 2 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Remarks
			Total.	Per square inch.	Total.	Per square inch.						
	Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*In. Sq. in.*	*Per ct.*		
	.505	.20	12,200	61,000	18,420	92,100	.53	26.5	Diam.. .31=.0755	62.2	Fine silky	Oil treated.
•	.505	.20	9,980	49,900	15,920	79,600	.60	30.0	Diam.. .34=.0908	54.6	.....do	Annealed in sand.
••	.505	.20	10,950	54,750	18,010	90,050	.50	25.0	Diam.. .34=.0908	54.6	.....do	Air cooled.
1	.505	.20	7,220	36,100	15,280	76,400	.35	17.5	Diam.. .36=.1018	49.1	Silky	
2	.505	.20	7,150	35,750	15,580	77,900	.34	17.0	Diam.. .36=.1018	49.1	.....do	
3	.505	.20	7,800	39,000	15,320	76,600	.33	16.5	Diam.. .36=.1018	49.1	.....do	
CARRIER RINGS FOR 7-INCH MORTARS.												
1	.564	.25	12,960	51,840	22,410	89,640	.44	22.0	Diam.. .41=.1320	47.2	Silky	
2	.564	.25	13,100	52,400	20,520	82,080	.55	27.5	Diam.. .39=.1194	52.2	.....do	
3	.505	.20	9,620	48,100	16,510	82,550	[1].66	22.0	Diam.. .35=.0962	51.9	.....do	
CARRIER RINGS FOR 3.6-INCH MORTARS.												
1	.505	.20	11,400	57,000	17,510	87,550	.54	27.0	Diam.. .31=.0755	62.2	Fine silky	
2	.505	.20	12,390	61,950	19,120	95,600	.48	24.0	Diam.. .33=.0855	57.2	.....do	
3	.505	.20	11,920	59,600	18,100	90,500	.58	26.5	Diam.. .32=.0804	59.8	.....do	

[1] Elongation in 3″.

FRACTURED STEEL COUNTERSHAFT.

Longitudinal specimens from $2\frac{1}{16}$" blower countershaft which fractured in service.

Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.
		Total.	Per square inch.	Total.	Per square inch.					
Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per cent.*	*In. Sq. in.*	*Per cent.*	
.564	.25	14,850	59,400	18,810	75,240	.63	21.0	Diam.. .37=.1075	57.0	Fine silky.
.564	.25	14,620	58,480	18,710	74,840	.62	20.7	Diam.. .37=.1075	57.0	Do.

NOTE.—A specimen 1"×¼" in cross-sections dimensions was taken from shaft alongside these tension specimens and bent cold 180° without fracture.

STEEL CASTING.

Samples marked 1 and 2 for compression and tension tests, respectively, were taken out of the casting side by side.

Compression Tests.

No. 1165.

Marks, 1.
Length, 3″.86.
Diameter, 1″.006.
Sectional area, .795 square inch.
Gauged length, 3″.

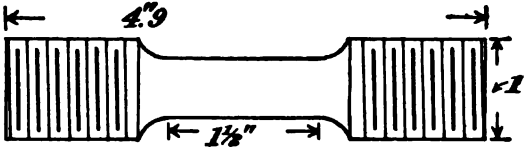
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
795	1,000	0.	0.	0.	0.	Initial load.
1,590	2,000	0.	0.			
2,385	3,000	.000033	.000033			
3,180	4,000	.000033	0.			
3,975	5,000	.000067	.000034			
4,770	6,000	.000100	.000033			
5,565	7,000	.000133	.000033			
6,360	8,000	.000167	.000034			
7,155	9,000	.000167	0.			
7,950	10,000	.000200	.000033	0.		
8,745	11,000	.000200	0.			
9,540	12,000	.000233	.000033			
10,335	13,000	.000267	.000034			
11,130	14,000	.000300	.000033			
11,925	15,000	.000333	.000033	0.		
12,720	16,000	.000367	.000034			
13,515	17,000	.000400	.000033			
14,310	18,000	.000433	.000033			
15,105	19,000	.000467	.000034			
15,900	20,000	.000500	.000033	0.		
16,695	21,000	.000533	.000033			
17,490	22,000	.000567	.000034			
18,285	23,000	.000567	0.			
19,080	24,000	.000600	.000033			
19,875	25,000	.000633	.000033	0.		
20,670	26,000	.000667	.000034			
21,465	27,000	.000700	.000033			
22,260	28,000	.000733	.000033			
23,055	29,000	.000767	.000034			
23,850	30,000	.000800	.000033	0.		
24,645	31,000	.000833	.000033			
25,440	32,000	.000867	.000034			Elastic limi
26,235	33,000	.000933	.000066			
27,030	34,000	.001033	.000100			
27,825	35,000	.001300	.000267			
28,620	36,000	.011533	.000233			
29,415	37,000	.012333	.000800			
30,210	38,000	.012967	.000634			
31,005	39,000	.014000	.001033			
31,800	40,000	.015200	.001200			
86,300	108,550					Ultimate strength.

Failed by triple flexure.

No. 1166.

Marks, 2.
Length, 2″.45.
Diameter, 1″.005.
Sectional area, .793 square inch.
Approximate elastic limit, 28,300 pounds = 35,680 pounds per square inch.
No compressive ultimate strength found.
200,000 pounds total load applied, which shortened the sample to ″.92 long.
Test discontinued.

TENSION TESTS.



Test of No.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 1 inch.		Area at fracture.	Contraction of area.	Appearance of fracture.
				Total.	Per sq. inch.	Total.	Per sq. inch.					
		Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*Inch.* *Sq. in.*	*Per ct.*	
9590	1	.564	.25	9,710	38,840	15,600	62,400	.09	9	....	.....	Spongy; fractured at neck.
9591	2	.564	.25	9,410	37,640	17,700	70,800	.20	20	Diam..49 = 1886	24.6	Silky.

STEEL CASTINGS

FOR

HINGE LUG PLATES, 10-INCH AND 12-INCH RIFLES.

No. 6118.

Marks, H P 1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000600	.000800	.....	.....	
6,000	30,000	.001050	.000450	.000050	.000050	
6,200	31,000	.001100	.000050	.....	.....	
6,400	32,000	.001150	.000050	.....	.....	Elastic limit.
6,600	33,000	.002000	.000850	.....	.....	
6,800	34,000	.010750	.008750	.....	.....	
7,000	35,000	.012250	.001500	.....	.....	
7,200	36,000	.013500	.001250	.....	.....	
7,400	37,000	.014500	.001000	.....	.....	
7,600	38,000	.015950	.001450	.....	.....	
8,000	40,000	.018100	.002150	.....	.....	
8,400	42,000	.021000	.002900	.....	.....	
8,800	44,000	.024000	.003000	.....	.....	
9,200	46,000	.027500	.003500	.....	.....	
9,600	48,000	.030000	.002500	.....	.....	
10,000	50,000	.035400	.005400	.....	.....	
10,400	52,000	.039250	.003850	.....	.....	
11,200	56,000	.0500	.010750	.....	.....	
12,000	60,000	.0650	.0150	.....	.....	
12,800	64,000	.0850	.0200	.....	.....	
13,600	68,000	.1350	.0500	.....	.....	
13,910	69,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	69,550
Elastic limit per square inch of original section	do...	32,000
Elongation per inch after rupture	inch..	.2700
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		at middle of stem
Character of broken surface		silky, oblique
Elongation of inch sections		".37*, ".27*

No. 6119.

Marks, H P 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000850	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001000	.000350	0.	.....	
6,200	31,000	.001100	.000100	.....	.....	Elastic limit.
6,400	32,000	.011000	.009900	.....	.....	
6,600	33,000	.011500	.000500	.....	.....	
6,800	34,000	.012550	.001050	.....	.....	
7,000	35,000	.013400	.000850	.....	.....	
7,200	36,000	.015000	.001600	.....	.....	
7,600	38,000	.017400	.002400	.....	.....	
8,000	40,000	.020500	.003100	.....	.....	
8,400	42,000	.023500	.003000	.....	.....	
8,800	44,000	.027250	.003750	.....	.....	
9,200	46,000	.031500	.004250	.....	.....	
9,600	48,000	.035500	.004000	.....	.....	
10,000	50,000	.040500	.005000	.....	.....	
10,400	52,000	.045650	.005150	.....	.....	
11,200	56,000	.0600	.014350	.....	.....	
12,000	60,000	.0800	.0200	.....	.....	
12,800	64,000	.1250	.0450	.....	.....	
12,920	64,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	64,600
Elastic limit per square inch of original section	do...	31,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.001100
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		".7 from neck
Character of broken surface		granular 50 per cent, silky 50 per cent
Elongation of inch sections		".13, ".17

No. 6120.

Marks, H P 3.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000650	.000300	.....	.....	
6,000	30,000	.001050	.000400	.000050	.000050	
7,000	35,000	.001400	.000350	.....	.....	
7,200	36,000	.001450	.000050	.....	.....	
7,400	37,000	.001450	0.	.....	.....	
7,600	38,000	.001500	.000050	.....	.....	
7,800	39,000	.001600	.000100	.....	.....	Elastic limit.
8,000	40,000	.011250	.009650	.....	.....	
8,200	41,000	.012500	.001250	.....	.....	
8,400	42,000	.013500	.001000	.....	.....	
8,800	44,000	.015500	.002000	.....	.....	
9,200	46,000	.017750	.002250	.....	.....	
9,600	48,000	.019500	.001750	.....	.....	
10,000	50,000	.022100	.002600	.....	.....	
10,400	52,000	.025000	.002900	.....	.....	
11,400	56,000	.0350	.0100	.....	.....	
12,000	60,000	.0400	.0050	.....	.....	
12,800	64,000	.0500	.0100	.....	.....	
13,600	68,000	.0600	.0100	.....	.....	
14,400	72,000	.0800	.0200	.....	.....	
15,200	76,000	.1150	.0350	.....	.....	
15,440	77,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,200
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		at middle of stem
Character of broken surface		granular 60 per cent, silky 40 per cent
Elongation of inch sections		".20*, ".22*

No. 6121.

Marks, H P 4.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000800	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.000950	.000400	0.	.....	
7,000	35,000	.001150	.000200	.....	.....	Elastic limit.
7,200	36,000	.008250	.007100	.....	.....	
7,400	37,000	.010000	.001750	.....	.....	
7,600	38,000	.010500	.000500	.....	.....	
7,800	39,000	.010900	.000400	.....	.....	
8,000	40,000	.011800	.000900	.....	.....	
8,400	42,000	.013500	.001700	.....	.....	
8,800	44,000	.015700	.002200	.....	.....	
9,200	46,000	.018000	.002300	.....	.....	
9,600	48,000	.020500	.002500	.....	.....	
10,000	50,000	.022600	.002100	.....	.....	
10,400	52,000	.025500	.002900	.....	.....	
11,200	56,000	.0350	.0095	.....	.....	
12,000	60,000	.0400	.0050	.....	.....	
12,800	64,000	.0500	.0100	.....	.....	
13,600	68,000	.0650	.0150	.....	.....	
14,400	72,000	.0850	.0200	.....	.....	
15,100	75,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	75,500
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		".95 from neck
Character of broken surface		granular 70 per cent, silky 30 per cent.
Elongation of inch sections		".25*, ".15

BRONZE.

GUN-CARRIAGE METAL.

3-INCH FIELD CARRIAGE.

Description.	Marks.	Diameter.	Sectional area.	Tensile strength. Total.	Tensile strength. Per square inch.	Elongation in 2 inches.	Contraction of area.	Fracture.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*	
Cradle	1	.798	.50	14,810	29,620	5.0	4.4	Lavender-yellow color with brilliant needlelike crystallization.
Do	2	.798	.50	14,360	28,720	5.0	4.4	Do.
Do	3	.798	.50	18,420	36,840	5.0	4.4	Light yellow, brilliant needlelike crystals.
Do	4	.564	.25	11,040	44,160	13.0	15.0	Uniform light-yellow color.
Do	5	.564	.25	10,180	40,720	10.5	11.8	Do.

15-POUNDER GUN MOUNTS.

Oscillating slide	A 1 O S 15	.798	.50	15,380	30,760	19.0	16.2	Light yellow, in part interspersed with darker yellow metal.
Recoil sleeve	A 1 R S 15	.798	.50	18,390	36,780	24.5	20.8	Light yellow, with section of golden yellow at the circumference.
Do	A 6 R S 15	.798	.50	13,720	27,440	18.0	18.6	Patches of light-yellow, golden-yellow, and greenish-yellow metal interspersed.
Do	A 5 R S 15	.798	.50	14,100	28,200	17.5	16.4	Light-yellow and golden-yellow metal interspersed.
Do	A 6 R S 15	.798	.50	18,080	36,060	23.5	23.0	Golden-yellow color.
Do	A 7 R S 15	.798	.50	17,910	35,820	12.5	16.4	Light yellow with belt of lavender color across middle of surface.
Do	A 2 2 R S 15	.798	.50	10,720	21,440	13.5	11.6	Golden-yellow, irregular surface. Opened cracks along the stem.
Pivot yoke	A 1 P Y 15	.798	.50	17,080	34,160	30.5	27.4	Dark golden yellow, lighter at the circumference.
Do	A 2 P Y 15	.798	.50	19,790	39,580	37.0	31.6	Light yellow, darker on one side.
Do	A 8 P Y 15	.798	.50	13,960	27,920	7.5	6.8	Light-yellow and lavender-colored metal interspersed.
Do	A 4 P Y 15	.798	.50	15,510	31,020	19.0	23.0	Uniform golden yellow.

GUN-CARRIAGE METAL—Continued.

15-POUNDER GUN MOUNTS—Continued.

Description.	Marks.	Diameter.	Sectional area.	Tensile strength. Total.	Tensile strength. Per square inch.	Elongation in 2 inches.	Contraction of area.	Fracture.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*	
Pivot yoke	A 5 P Y 15	.798	.50	19,560	39,120	16.5	18.6	Light yellow with belt of lavender color across middle of surface.
Do	A 6 P Y 15	.798	.50	20,920	41,840	26.5	23.0	Dark-yellow color, with a band of lavender-colored metal across center of surface.
Do	A 7 P Y 15	.798	.50	17,610	35,220	16.0	18.6	Do.
Do	A 8 P Y 15	.798	.50	21,020	42,040	33.5	31.6	Dark golden yellow.

6-POUNDER GUN MOUNTS.

Pivot saddle	A 1 P S 6	.798	.50	17,480	34,960	33.5	27.4	Light yellow.
Recoil sleeve	A 2 R S 6	.798	.50	11,720	23,440	14.5	11.6	Golden yellow, 60 per cent: dark brownish yellow, 40 per cent.
Do	A 7 R S 6	.798	.50	19,800	39,600	29.0	28.4	Uniform light golden yellow.
Do	A 8 R S 6	.798	.50	19,470	38,940	38.0	31.6	Do.
Do	A 9 R S 6	.798	.50	16,070	32,140	17.5	16.4	Yellow and dark-brown metal interspersed.
Do	A 10 R S 6	.798	.50	17,500	35,000	20.0	20.8	Uniform light golden yellow.
Do	A 13 R S 6	.798	.50	23,400	46,800	42.0	33.6	Uniform light yellow.
Do	A 2 2 R S 6	.798	.50	8,340	16,680	10.0	6.8	Golden yellow, irregular surface. Opened cracks along the stem.
Oscillating slide	A 1 O S 6	.798	.50	12,680	25,360	15.5	11.6	Lavender yellow, with patches of dark golden yellow metal.
Do	A 2 O S 6	.798	.50	16,970	33,940	22.0	20.8	Uniform light golden metal.
Do	A 5 O S 6	.798	.50	17,630	35,260	19.5	20.8	Do.

Do	A 6 OS 6	.798	.50	16,210	32,420	17.0	16.4	Light yellow with patches of dark-yellow and lavender-colored metal interspersed.
Do	A 7 OS 6	.798	.50	16,080	32,160	19.0	20.8	Uniform light yellow.
Do	A 1 2 O S 6	.505	.20	5,870	29,350	20.0	20.5	Light and golden yellow metal interspersed. Opened cracks along the stem.
Do	A 1 3 O S 6	.564	.25	5,210	20,840	11.0	8.4	Dark copper colored, light and golden yellow metal interspersed.
Pivot yoke	A 2 P Y 6	.798	.50	16,610	33,220	22.0	18.6	Greenish and golden-yellow metal interspersed.
Do	A 4 P Y 6	.798	.50	18,620	37,240	27.5	23.0	Uniform light golden yellow.
Do	A 5 P Y 6	.798	.50	18,010	36,020	31.0	27.4	Do.
Do	A 6 P Y 6	.798	.50	18,340	36,680	23.5	20.8	Do.
Do	A 7 P Y 6	.798	.50	18,200	36,400	28.0	23.0	Uniform golden yellow.
Do	A 8 P Y 6	.798	.50	16,120	32,240	19.0	16.4	Do.
Do	A 10 P Y 6	.798	.50	18,680	37,360	31.0	27.4	Uniform light golden yellow.
Do	A 11 P Y 6	.798	.50	24,060	48,120	43.5	33.6	Uniform light yellow.
Trail spade	T S 1	.798	.50	24,420	48,840	28.0	31.6	Uniform light-yellow color.
Do	T S 4	.798	.50	23,200	46,400	15.5	18.6	Lavender yellow, with golden-yellow metal finely interspersed.
Do	T S 6	.798	.50	11,700	23,400	9.0	14.0	Lavender yellow, with lemon-yellow metal on one side. Spongy spot at circumference.
Do	T S 6	.798	.50	13,910	27,820	6.0	11.6	Lavender and lemon-yellow metal interspersed.
Do	T S 7	.798	.50	24,710	49,420	20.0	23.0	Fine silky, lavender colored.
Do	T S 8	.798	.50	15,570	31,140	29.0	29.4	Light-yellow and lavender-colored metal interspersed.
Do	T S 9	.798	.50	12,600	25,200	5.5	9.2	Light lavender colored, with irregular sections of lemon-yellow metal.
Do	T S 10	.798	.50	21,980	43,960	13.5	23.0	Fine silky, lavender colored.
Do	T S 2	.798	.50	14,100	28,200	7.0	9.2	Light lavender, with streaks of yellow metal.
Trail head	T H 1	.798	.50	17,710	35,420	6.5	11.6	Light yellowish lavender, dark spongy spot at circumference.
Do	T H 2	.798	.50	18,420	36,840	7.0	11.6	Do.
Do	T H 3	.798	.50	23,310	46,620	12.5	18.6	Light lavender, radiating from spot of yellow metal at center of bar.
Do	T H 4	.798	.50	15,120	30,240	5.0	6.8	Light lavender, 60 per cent; dark-brown spongy, 40 per cent.
Recoil cylinder	R C 1	.798	.50	18,600	37,200	18.0	14.0	Light lavender, with occasional spots of yellow metal.

Parson's Manganese Bronze, Recast from Ingot.

Castings made in Watertown Arsenal Foundry. Metal purchased of The Wm. Cramp & Sons Ship and Engine Building Company.

Mark on specimen.	Diameter.	Sectional area.	Appproximate elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
			Total.	Per square inch.	Total.	Per square inch.						
	Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per cent.*	*In. Sq. in.*	*Per cent.*		
Dry sand casting.....	.798	.50	15,500	31,000	35,420	70,840	.66	22.0	Diam., .69 = .374	25.2	Uniform light-yellow color..	″.19, ″.27[a], ″.20
Green sand casting....	.798	.50	15,200	30,400	24,300	48,600	.14	4.7	Diam., .75 = .442	11.6	Lavender colored, 60 per cent; lemon yellow, 40 per cent.....	.03, .09[a], .02

PARSON'S MANGANESE BRONZE.

Recast from ingot at Watertown arsenal.

No. 6319.

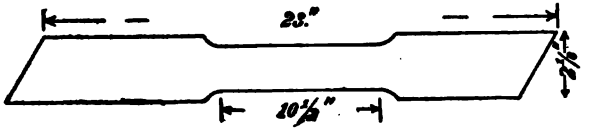
Diameter, 1″.105.
Sectional area, .959 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
959	1,000	0.	0.	0.	0.	Initial load.
4,795	5,000	.00080	.00080	0.	.....	
9,590	10,000	.00068	.00038	—.00001	—.00001	
14,385	15,000	.00111	.00043	.00003	.00004	
15,344	16,000	.00130	.00019	.....	.....	
16,303	17,000	.00139	.00009	.....	.....	No well-defined elastic limit.
17,262	18,000	.00148	.00009	.....	.....	
18,221	19,000	.00160	.00012	.....	.....	
19,180	20,000	.00175	.00015	.00020	.00017	
20,139	21,000	.00188	.00013	.....	.....	
21,098	22,000	.00207	.00019	.....	.....	
22,057	23,000	.00221	.00014	.....	.....	
23,016	24,000	.00240	.00019	.....	.....	
23,975	25,000	.00260	.00020	.00052	.00032	
24,934	26,000	.00272	.00012	.....	.....	
25,893	27,000	.00300	.00028	.....	.....	
26,852	28,000	.00328	.00028	.....	.....	
27,811	29,000	.00358	.00030	.....	.....	
28,770	30,000	.00399	.00041	.00139	.00087	
30,688	32,000	.00479	.00080	.....	.....	
32,606	34,000	.00612	.00133	.....	.....	
34,524	36,000	.00803	.00191	.....	.....	
36,442	38,000	.01040	.00237	.....	.....	
38,360	40,000	.01385	.00345	.01012	.00873	
40,278	42,000	.01726	.00341	.....	.....	
42,196	44,000	.02280	.00554	.....	.....	
44,114	46,000	.02810	.00530	.02369	.01357	
52,600	54,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	54,850
Elastic limit per square inch of original section		not well defined
Elongation per inch after rupture	inch..	.0630
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		11.5
Position of rupture		4″.7 from neck
Character of broken surface		light yellow, with patches of lemon-yellow metal interspersed
Elongation of inch sections		″.05, ″.06, ″.05, ″.05, ″.07, ″.09, ″.12*, ″.05, ″.04, ″.05

CARTRIDGE BRASS.



No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.								
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.														
		Inches.	*Inches.*	*Sq. inch.*	*Pounds*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	*In. In. Sq. in.*	*Per ct.*		"	"	"	"	"	"	"	"	"
9619	35.....	1.498	.1193	.1787	2,750	15,390	8,140	45,550	5.82	58.2	1.04×.06=.0624	65.1	Uniform silky.	.47,	.49,	.52,	.56,	.61,	.58,	.58,	.89*,	.58, .54
9620	36.....	1.498	.1202	.1800	2,480	13,780	8,030	44,610	5.89	58.9	1.04×.06=.0624	65.3	.....do.....	.48,	.58,	.52,	.52,	.55,	.59,	.62,	.92*,	.63, .53
9621	C.....	1.500	.1192	.1788	2,720	15,210	8,320	46,530	6.12	61.2	1.03×.06=.0618	65.4	.....do.....	.58,	.55,	.52,	.57,	.56,	.92*,	.66,	.63,	.63, .55
9622	C_1	1.500	.1182	.1773	2,980	16,810	8,240	46,470	5.43	54.3	1.02×.07=.0714	59.7	.....do.....	.46,	.46,	.46,	.49,	.54,	.89*,	.60,	.53,	.52, .48
9623	E_1	1.498	.1178	.1765	2,960	16,770	8,310	47,080	6.29	62.9	1.04×.06=.0624	64.6	.....do.....	.57,	.58,	.58,	.59,	.60,	.62,	.63,	.63,	.89*, .60
9624	C_2	1.501	.1185	.1779	2,720	15,290	8,240	46,320	6.39	63.9	1.04×.06=.0624	64.9	.....do.....	.54,	.57,	.57,	.60,	.59,	.60,	.86*,	.72,	.68, .66
9625	C_3	1.500	.1180	.1770	2,900	16,380	8,430	47,630	6.15	61.5	1.07×.05=.0585	69.8	.....do.....	.58,	.55,	.57,	.60,	.59,	.58,	.85*,	.62,	.62, .59
9626	E_2	1.498	.1188	.1780	2,800	15,730	8,440	47,420	5.88	58.8	1.04×.05=.0520	70.8	..... do.....	.48,	.48,	.49,	.52,	.58,	.57,	.63,	.65,	.86*, .67

CAST COPPER.

METAL SUBMITTED BY C. L. LEIBY, KNOXVILLE, TENN., TO THE BOARD OF ORDNANCE AND FORTIFICATIONS.

No. 5985.

Tagged, "medium hard copper."
Marked, E.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000000	.000000	.....	.....	
750	3,000	.000050	.000050	.....	.....	
1,000	4,000	.000050	0.	.....	.....	
1,250	5,000	.000050	0.	.....	.....	
1,500	6,000	.000150	.000100	.....	.....	
1,750	7,000	.000250	.000100	.....	.....	Elastic limit.
2,000	8,000	.000450	.000200	.....	.....	
2,250	9,000	.000800	.000350	.....	.....	
2,500	10,000	.001500	.000700	.000900	.000900	
2,750	11,000	.002450	.000950	.....	.....	
3,000	12,000	.005950	.003500	.....	.....	
3,250	13,000	.009550	.003600	.....	.....	
3,500	14,000	.018250	.008700	.....	.....	
3,750	15,000	.023500	.005250	.....	.....	
4,000	16,000	.033250	.009750	.....	.....	
4,250	17,000	.038700	.005450	.....	.....	
4,500	18,000	.050000	.011300	.....	.....	
4,620	18,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	18,480
Elastic limit per square inch of original section	do...	7,000
Elongation per inch after rupture	inch..	.0850
Elongation per inch under strain at elastic limit	do...	.000250
Reduction in diameter at point of rupture	do...	.034
Reduction in area after rupture, per cent of original section		11.8
Position of rupture		".50 from neck
Character of broken surface		dull brownish-yellow 90 per cent, spongy 10 per cent. Blow holes were found along the length of the specimen.
Elongation of inch sections		".04, ".13*

Hardness determination: Pressure of 7,350 pounds on indenting tool made cut in copper 1 inch long.

No. 5986.

Tagged, "hard copper."
Marked F.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000050	.000050	.....	.....	
750	3,000	.000050	0.	.....	.....	
1,000	4,000	.000150	.000100	.....	.....	Elastic limit.
1,250	5,000	.000350	.000200	.....	.....	
1,500	6,000	.000500	.000150	.....	.....	
1,750	7,000	.000550	.000050	.....	.....	
2,000	8,000	.001000	.000450	.....	.....	
2,250	9,000	.001600	.000600	.....	.....	
2,500	10,000	.008750	.002150	.003000	.003000	
2,750	11,000	.007050	.003300	.....	.....	
3,000	12,000	.013000	.005950	.....	.....	
3,250	13,000	.019000	.006000	.....	.....	
3,500	14,000	.030000	.011000	.....	.....	
3,750	15,000	.035750	.005750	.....	.....	
4,000	16,000	.047750	.012000	.....	.....	
4,250	17,000	.056500	.008750	.....	.....	
4,500	18,000	.072250	.015750	.....	.....	
4,610	18,440	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	18,440
Elastic limit per square inch of original section	do...	4,000
Elongation per inch after rupture	inch..	.0950
Elongation per inch under strain at elastic limit	do...	.000150
Reduction in diameter at point of rupture	do...	.034
Reduction in area after rupture, per cent of original section		11.8
Position of rupture		".4 from neck
Character of broken surface		brownish-yellow 60 per cent, spongy 40 per cent
Elongation of inch sections		".13*, ".06

Hardness determination: Pressure of 7,540 pounds on indenting tool made cut in copper 1 inch long.

The standard pressure on indenting tool is 10,000; these specimens yielding the full length of cut of the tool at lower pressures are therefore softer than the initial point in the scale of hardness for iron and steel.

COPPER CYLINDERS FOR PRESSURI

Mean compression of 10 copper cylinders from lot of 100 received from Frankford Arsenal May 9, 1899. Metal of September, 1896.

Table for use with crusher gauge one-thirtieth square inch area.

Mean dimensions of cylinders: Length, ".4990; diameter, ".2050.

Load per square inch on crusher gauge $\frac{1}{30}$ square inch area.	Total compressions.											Mean corrected sets.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Mean.	
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
3,000	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6,000	.0003	.0005	.0008	.0005	.0006	.0008	.0008	.0005	.0002	.0006	.0005	.0005
9,000	.0012	.0012	.0016	.0012	.0014	.0005	.0018	.0012	.0007	.0016	.0012	.0011
10,000	.0016	.0018	.0022	.0015	.0017	.0006	.0028	.0016	.0015	.0024	.0018	.0017
11,000	.0031	.0030	.0033	.0020	.0025	.0009	.0037	.0023	.0028	.0037	.0027	.0026
12,000	.0046	.0042	.0043	.0033	.0036	.0025	.0058	.0035	.0042	.0050	.0041	.0040
13,000	.0066	.0057	.0057	.0049	.0042	.0043	.0070	.0053	.0059	.0069	.0057	.0056
14,000	.0079	.0075	.0075	.0063	.0059	.0060	.0095	.0072	.0074	.0085	.0074	.0072
15,000	.0097	.0093	.0093	.0085	.0075	.0080	.0106	.0085	.0095	.0105	.0091	.0089
16,000	.0115	.0110	.0110	.0100	.0091	.0092	.0126	.0105	.0110	.0115	.0107	.0104
17,000	.0134	.0127	.0125	.0117	.0110	.0115	.0142	.0120	.0130	.0138	.0126	.0122
18,000	.0155	.0145	.0142	.0134	.0130	.0131	.0164	.0140	.0145	.0154	.0144	.0140
19,000	.0168	.0165	.0163	.0150	.0144	.0152	.0177	.0156	.0165	.0171	.0161	.0157
20,000	.0191	.0185	.0189	.0165	.0172	.0170	.0206	.0179	.0187	.0195	.0184	.0179
21,000	.0209	.0200	.0204	.0197	.0183	.0191	.0217	.0197	.0207	.0207	.0201	.0196
22,000	.0225	.0223	.0225	.0210	.0205	.0207	.0245	.0220	.0223	.0232	.0222	.0217
23,000	.0252	.0241	.0241	.0225	.0225	.0231	.0257	.0255	.0253	.0263	.0244	.0238
24,000	.0268	.0260	.0265	.0252	.0244	.0248	.0280	.0261	.0267	.0270	.0262	.0256
25,000	.0289	.0278	.0275	.0265	.0263	.0270	.0304	.0275	.0282	.0295	.0280	.0273
26,000	.0315	.0300	.0296	.0289	.0281	.0294	.0329	.0301	.0310	.0330	.0304	.0297
27,000	.0335	.0324	.0324	.0315	.0307	.0311	.0344	.0318	.0328	.0335	.0324	.0316
28,000	.0348	.0340	.0344	.0335	.0326	.0335	.0367	.0345	.0354	.0354	.0345	.0337
29,000	.0370	.0359	.0366	.0351	.0348	.0353	.0391	.0370	.0369	.0375	.0365	.0356
30,000	.0393	.0386	.0386	.0371	.0379	.0375	.0424	.0380	.0392	.0403	.0389	.0379
31,000	.0417	.0414	.0409	.0400	.0395	.0400	.0432	.0408	.0415	.0424	.0411	.0401
32,000	.0440	.0430	.0428	.0424	.0420	.0430	.0462	.0430	.0440	.0442	.0435	.0425
33,000	.0465	.0443	.0459	.0455	.0442	.0446	.0483	.0464	.0460	.0475	.0459	.0449
34,000	.0479	.0468	.0474	.0471	.0458	.0466	.0500	.0479	.0480	.0489	.0476	.0465
35,000	.0505	.0496	.0511	.0487	.0480	.0492	.0527	.0492	.0507	.0517	.0501	.0490
36,000	.0530	.0519	.0518	.0510	.0511	.0509	.0542	.0520	.0535	.0537	.0523	.0512
37,000	.0547	.0535	.0540	.0540	.0530	.0531	.0572	.0540	.0550	.0563	.0545	.0534
38,000	.0570	.0560	.0566	.0555	.0550	.0569	.0596	.0570	.0576	.0581	.0569	.0558
39,000	.0596	.0587	.0588	.0570	.0575	.0586	.0622	.0594	.0597	.0609	.0592	.0581
40,000	.0611	.0614	.0613	.0605	.0590	.0608	.0636	.0610	.0621	.0632	.0614	.0603
41,000	.0645	.0635	.0639	.0637	.0620	.0630	.0670	.0640	.0658	.0653	.0643	.0632
42,000	.0661	.0657	.0662	.0650	.0640	.0650	.0694	.0665	.0675	.0680	.0663	.0652
43,000	.0684	.0682	.0690	.0675	.0675	.0670	.0712	.0681	.0691	.0694	.0685	.0674
44,000	.0722	.0704	.0714	.0695	.0693	.0698	.0740	.0711	.0726	.0732	.0713	.0702
45,000	.0744	.0721	.0731	.0731	.0721	.0733	.0769	.0745	.7755	.0749	.0740	.0729
46,000	.0762	.0755	.0771	.0755	.0748	.0745	.0785	.0764	.0765	.0768	.0762	.0751
47,000	.0788	.0780	.0793	.0769	.0772	.0773	.0807	.0800	.0784	.0790	.0786	.0774
48,000	.0834	.0805	.0820	.0795	.0797	.0805	.0845	.0825	.0828	.0828	.0818	.0806
49,000	.0840	.0828	.0841	.0830	.0829	.0826	.0870	.0840	.0852	.0845	.0840	.0828
50,000	.0870	.0860	.0875	.0853	.0852	.0858	.0896	.0866	.0875	.0880	.0868	.0856
51,000	.0914	.0892	.0900	.0882	.0880	.0873	.0917	.0896	.0905	.0904	.0896	.0884
52,000	.0925	.0910	.0920	.0905	.0906	.0905	.0940	.0917	.0924	.0929	.0918	.0906
53,000	.0948	.0935	.0960	.0932	.0940	.0934	.0975	.0940	.0952	.0952	.0947	.0935
54,000	.0982	.0962	.0979	.0968	.0960	.0965	.1006	.0986	.0980	.0981	.0977	.0965
55,000	.1014	.0986	.1002	.0985	.0988	.0985	.1020	.0997	.1005	.1005	.0999	.0987
56,000	.1029	.1010	.1038	.1011	.1022	.1012	.1058	.1030	.1041	.1032	.1028	.1016
57,000	.1064	.1048	.1066	.1036	.1050	.1049	.1082	.1060	.1060	.1057	.1057	.1045
58,000	.1095	.1074	.1083	.1072	.1072	.1074	.1110	.1081	.1090	.1088	.1084	.1072
59,000	.1109	.1090	.1119	.1112	.1100	.1100	.1130	.1114	.1109	.1120	.1110	.1097
60,000	.1137	.1128	.1140	.1124	.1129	.1129	.1175	.1140	.1140	.1144	.1139	.1126
61,000	.1172	.1180	.1178	.1145	.1150	.1149	.1200	.1160	.1166	.1170	.1167	.1154
62,000	.1199	.1190	.1204	.1187	.1184	.1178	.1210	.1194	.1196	.1190	.1193	.1180
63,000	.1223	.1209	.1226	.1209	.1205	.1213	.1242	.1223	.1225	.1216	.1219	.1206
64,000	.1252	.1235	.1249	.1244	.1228	.1237	.1271	.1238	.1250	.1243	.1245	.1232
65,000	.1279	.1264	.1270	.1257	.1259	.1264	.1305	.1274	.1274	.1266	.1271	.1258
66,000	.1306	.1296	.1296	.1290	.1295	.1298	.1330	.1304	.1310	.1305	.1303	.1290
67,000	.1329	.1320	.1328	.1312	.1320	.1314	.1352	.1323	.1326	.1332	.1326	.1313
68,000	.1355	.1346	.1358	.1345	.1359	.1346	.1384	.1356	.1355	.1360	.1356	.1342
69,000	.1397	.1380	.1387	.1376	.1376	.1375	.1417	.1381	.1387	.1380	.1386	.1372
70,000	.1432	.1394	.1409	.1393	.1405	.1401	.1431	.1400	.1406	.1407	.1408	.1394
71,000	.1449	.1433	.1448	.1433	.1435	.1424	.1460	.1435	.1434	.1445	.1440	.1426
72,000	.1480	.1463	.1470	.1456	.1458	.1457	.1494	.1459	.1464	.1468	.1467	.1453
73,000	.1500	.1480	.1496	.1476	.1488	.1486	.1514	.1481	.1480	.1488	.1489	.1475

oad per square nch on rusher gauge s square inch area.	Total compressions.										Mean.	Mean corrected sets.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.		
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
74,000	.1525	.1510	.1520	.1505	.1515	.1511	.1539	.1525	.1525	.1523	.1520	.1506
75,000	.1549	.1534	.1560	.1539	.1534	.1537	.1584	.1545	.1562	.1549	.1549	.1535
76,000	.1588	.1565	.1580	.1552	.1569	.1560	.1608	.1561	.1575	.1570	.1573	.1559
77,000	.1615	.1587	.1605	.1585	.1591	.1595	.1631	.1595	.1597	.1595	.1600	.1586
78,000	.1635	.1630	.1634	.1615	.1618	.1613	.1652	.1625	.1620	.1625	.1627	.1613
79,000	.1673	.1645	.1660	.1637	.1647	.1644	.1676	.1657	.1653	.1650	.1654	.1640
80,000	.1698	.1670	.1689	.1664	.1670	.1672	.1703	.1677	.1686	.1672	.1680	.1666
81,000	.1713	.1695	.1710	.1696	.1710	.1694	.1728	.1700	.1705	.1700	.1705	.1691
82,000	.1748	.1719	.1724	.1713	.1721	.1721	.1751	.1732	.1730	.1735	.1729	.1715
83,000	.1779	.1747	.1750	.1749	.1755	.1748	.1784	.1749	.1765	.1768	.1759	.1745
84,000	.1805	.1775	.1778	.1775	.1784	.1769	.1810	.1775	.1780	.1785	.1784	.1770
85,000	.1821	.1800	.1805	.1790	.1800	.1800	.1832	.1800	.1795	.1808	.1805	.1791
86,000	.1845	.1823	.1825	.1826	.1828	.1831	.1854	.1823	.1820	.1835	.1831	.1817
87,000	.1877	.1859	.1860	.1850	.1855	.1853	.1876	.1863	.1850	.1864	.1861	.1847
88,000	.1898	.1875	.1880	.1873	.1874	.1877	.1898	.1880	.1870	.1880	.1881	.1867
89,000	.1924	.1900	.1915	.1898	.1903	.1902	.1925	.1902	.1896	.1900	.1906	.1892
90,000	.1962	.1937	.1935	.1928	.1926	.1920	.1949	.1925	.1921	.1930	.1933	.1919
91,000	.1978	.1958	.1950	.1947	.1955	.1942	.1974	.1945	.1946	.1960	.1956	.1942
92,000	.1996	.1977	.1990	.1975	.1981	.1985	.1993	.1969	.1983	.1976	.1982	.1968
93,000	.2018	.2001	.2010	.1995	.2005	.2007	.2024	.1991	.2000	.2012	.2006	.1992
94,000	.2051	.2024	.2025	.2030	.2043	.2026	.2044	.2021	.2025	.2027	.2032	.2018
95,000	.2070	.2053	.2057	.2050	.2060	.2049	.2060	.2044	.2044	.2050	.2054	.2040
96,000	.2088	.2069	.2077	.2064	.2077	.2070	.2086	.2065	.2065	.2071	.2073	.2059
97,000	.2125	.2095	.2095	.2081	.2100	.2093	.2112	.2088	.2089	.2098	.2098	.2084
98,000	.2149	.2119	.2120	.2105	.2125	.2115	.2128	.2117	.2110	.2125	.2121	.2107
99,000	.2170	.2142	.2143	.2130	.2150	.2138	.2160	.2140	.2143	.2150	.2147	.2133
100,000	.2192	.2165	.2169	.2156	.2165	.2164	.2184	.2158	.2159	.2164	.2168	.2154

"LUMEN" METAL.

Metal submitted by Bierbaum & Merrick, Cincinnati, Ohio.

TENSION TEST.

No. 6368.

Diameter, 1".129.
Sectional area, 1.00 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000075	.000075	.....	.....	
3,000	3,000	.000150	.000075	.....	.....	
4,000	4,000	.000225	.000075	.....	.....	
5,000	5,000	.000325	.000100	.....	.....	
6,000	6,000	.000400	.000075	.....	.....	
7,000	7,000	.000500	.000100	.....	.....	
8,000	8,000	.000575	.000075	.....	.....	
9,000	9,000	.000650	.000075	.....	.....	
10,000	10,000	.000750	.000100	.000050	.000050	
11,000	11,000	.000850	.000100	.....	.....	
12,000	12,000	.000975	.000125	.....	.....	
13,000	13,000	.001075	.000100	.....	.....	
14,000	14,000	.001175	.000100	.....	.....	
15,000	15,000	.001300	.000125	.000200	.000150	
16,000	16,000	.001425	.000125	.....	.....	
17,000	17,000	.001575	.000150	.....	.....	
18,000	18,000	.001750	.000175	.....	.....	
19,000	19,000	.001900	.000150	.....	.....	
20,000	20,000	.002075	.000175	.000625	.000825	
20,300	20,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section ..... pounds.. 20,300
Elongation per inch after rupture ..... inch.. .0050
Reduction in area after rupture, per cent of original section ..... not appreciable
Position of rupture ..... ".85 from neck
Character of broken surface.... dull amorphous, silvery luster, interspersed with bright granulation
Elongation of inch sections ..... ".02*, ".00, ".00, ".00

LUMEN METAL.

COMPRESSION TEST.

Specimen taken from stem of tensile specimen.

No. 1167.

Length, 4″.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.000333	.000333	0.		
10,000	10,000	.000833	.000500	.000100	.000100	
11,000	11,000	.000933	.000100			
12,000	12,000	.001033	.000100			
13,000	13,000	.001200	.000167			
14,000	14,000	.001333	.000133			
15,000	15,000	.001467	.000134	.000400	.000800	
16,000	16,000	.001600	.000133			
17,000	17,000	.001700	.000100			
18,000	18,000	.001900	.000200			
19,000	19,000	.002100	.000200			
20,000	20,000	.002333	.000233	.000867	.000467	
21,000	21,000	.002500	.000167			
22,000	22,000	.002667	.000167			
23,000	23,000	.002967	.000300			
24,000	24,000	.003200	.000233			
25,000	25,000	.003500	.000300	.001600	.000733	
26,000	26,000	.003767	.000267			
27,000	27,000	.004200	.000433			
28,000	28,000	.004533	.000333			
29,000	29,000	.004867	.000334			
30,000	30,000	.005367	.000500	.003033	.001433	
32,000	32,000	.006467	.001100			
34,000	34,000	.007967	.001500			
36,000	36,000	.009600	.001633			
38,000	38,000	.011833	.002233			
40,000	40,000	.014933	.003100	.011867	.008834	
77,600	77,600					Tensile strength.

Deflected laterally, and sheared at one end.

CONCRETE AND MORTAR TESTS.

CONCRETE CUBES

FROM

BOSTON ELEVATED RAILWAY COM

STATEMENT BY GEORGE A. KIMBALL, CHIEF ENGINEER BOSTON ELEVATED RAILWAY COMPANY, OF THE CONDITIONS OF MAKING AND STORING THE CONCRETE CUBES SENT TO THE ARSENAL, AND WHICH WERE TESTED FROM DECEMBER, 1898, TO JULY, 1899.

MATERIALS USED.

Sand.—Coarse, clean, and sharp.
Voids measured loose and moist = 33 per cent.
Voids measured after settling by saturation with water = 25 per cent.
Broken stone.—Conglomerate from Roxbury, Mass.
Voids measured loose = 49.5 per cent.

Size of stone.

Passed.	Retained by—	Per cent by weight.
2½" ring	2" ring....	4.8
2" ring	1" ring....	76.7
1" ring	¼" ring....	18.0
¼" ring	.....	0.5
Total	.....	100.0

METHOD OF MIXING.

Sand and cement turned twice dry in a mortar box, then enough water mixed in to give the mortar about the consistency of damp sand. Mortar then spread evenly over the stone, which has previously been spread on a mortar platform and drenched with water. Mortar and stone then turned twice, and concrete rammed into the molds with iron rammers and tamping bars. On completing ramming, water barely flushed to the surface of the 1:0:2 and 1:2:4 mixtures, while the surface of the 1:3:6 and 1:6:12 mixtures merely appeared moist. The concrete was what would ordinarily be termed dry.

As most of the mixing was done in weather a little above or below the freezing point there were frequently frozen lumps in the sand. When such was the case, or when the temperature required it, the sand was heated. On this account the percentage of water used for the same mixture with different brands of cement varied considerably.

Owing to the cold weather the set of the concrete was slow, and the cubes were left in the molds from two to seven days in a room the temperature of which was usually about 40°, but which varied from 28° to 50°, and twice fell as low as 20°. When the temperature dropped below 32°, the concrete was protected from freezing by a covering of damp burlap.

After removal from the molds the blocks, except those tested at seven days, were buried in wet ground and left there till about a week before crushing. Some of the six months' cubes were, however, dug up about a month or six weeks before testing, when they were sent to the arsenal. The blocks were sent to the arsenal just as they were taken out of the molds or the ground, no patching or plastering of voids or broken corners being allowed. The mixing gang was one which had been at work making concrete for the foundations for the elevated structure, and the endeavor was to make concrete as nearly as possible like that which goes into actual construction work.

Detailed information as to the making and storing of each mixture of each brand of cement is given in tabular form below. The proportions of concrete given, 1:2:4, e. g., represent, respectively, parts by volume of cement, sand, and broken stone:

	Water used—per cent by weight of cement.	Days in molds.	Days in wet ground.				Temperature when made.		Remarks.
			Seven-day cubes.	Thirty-day cubes.	Three-month cubes.	Six-month cubes.	Mixing room.	Storing room.	
Saylor's, made Dec. 7, 1898.									
1:2: 4	26.6	2	3	25	84	180	° F. 37	° F. 37	Sand not heated; moist.
1:3: 6	32.6								
1:6:12	52.0								
Atlas, made Dec. 12, 1898.									
1:2: 4	31.2	3	2	23	84	174	26–31	36	Sand heated; dry.
1:3: 6	39.1								
1:6:12	65.6								
Alpha, made Dec. 16, 1898.									
1:0: 2	21.3	6	0	20	79	170	30–35	40	Sand heated; dry. Stone heated for 1:0:2 mixture.
1:2: 4	39.8								
1:3: 6	46.8								
1:6:12	77.7								
Alpha, made Jan. 26, 1899.									
1:0: 2	15.5	7			82	128	22–27	32	Sand heated; stone heated for 1:0:2 mixture.
1:2: 4	23.8								
Germania, made Dec. 23, 1898.									
1:0: 2	21.5	4	0	23	83	165	34–39	44	Sand heated; dry. Stone not heated.
1:2: 4	35.0								
1:3: 6	37.7								
1:6:12	66.5								
Germania, made Dec. 27, 1898.									
1:0: 2	23.5	1		22	82		30–35	40	
Germania, made Jan. 26, 1899.									
1:0: 2	15.8	7				128	22–27	32	Sand heated; stone heated for 1:0:2 mixture.
1:2: 4	22.1								
Alsen, made Dec. 30, 1898.									
1:0: 2	26.8	4	0	22	83	158	40	50	Sand heated; dry. Stone not heated.
1:2: 4	39.7								
1:3: 6	40.2								
1:6:12	93.7								
Alsen, made Jan. 26, 1899.									
1:2: 4	24.1	7			82	128	22–27	32	Sand heated.
Alsen, made Feb. 4, 1899.									
1:0: 2	22.0	9				117	29–32		

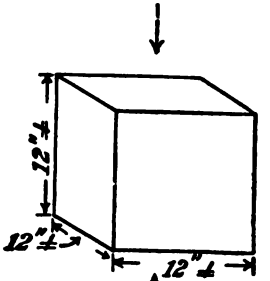
It will be seen from the above table that the average amount of water used with the different mixtures was in per cent by weight of cement as follows:

Mixture 1:0: 2 ..... 20.9
Mixture 1:2: 4 ..... 30.3
Mixture 1:3: 6 ..... 39.3
Mixture 1:6:12 ..... 71.1

This amount of water given includes only that mixed with the mortar; it does not include that used in wetting the stone.

The 1:6:12 blocks were in poor condition. This was due to the difficulty of getting so lean a mixture well rammed into the corners of molds so small as 12", and to the fact that the concrete had not attained sufficient strength, even though handled with care, to hold together well in the process of removal from the molds. The cubes of this mixture should have had a longer time to set before taking them out of the forms. In our foundation work we have used this mixture only as a filling with which to replace soft ground and on which to build the foundations proper.

CONCRETE AND MORTAR TESTS.



CONCRETE CUBES MADE OF SAYLOR'S PORTLAND CEMENT.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
A 54	1	2	4	.....	7	159	4	152.50	12.51	12.07	11.95	144.24	176,000	236,100	1,637	
55	.....	.....	.....	.....	7	150	4	'46.88	12.25	12.09	11.94	144.35	172,000	183,400	1,271	
56	.....	.....	.....	.....	7	153	12	152.70	12.19	11.82	12.07	142.67	198,000	258,100	1,809	
57	.....	.....	.....	.....	7	156	8	151.04	12.29	12.12	12.02	145.68	248,200	285,100	1,957	
58	.....	.....	.....	.....	9	151	4	148.89	12.19	12.01	11.99	144.00	172,800	279,900	1,944	
A 45	1	2	4	1	.....	157	0	151.78	12.30	12.05	12.06	145.32	301,000	351,000	2,415	
46	.....	.....	.....	1	.....	154	12	152.85	12.16	11.90	12.09	143.87	304,000	351,700	2,445	
48	.....	.....	.....	1	.....	149	4	.....	12.30	11.80	12.17	143.61	276,000	290,300	2,021	Voids.
49	.....	.....	.....	1	.....	157	12	152.66	12.36	12.11	11.98	144.47	321,000	360,700	2,497	
53	.....	.....	.....	1	.....	.....	.....	.....	12.47	11.90	12.02	143.04	269,000	276,000	1,930	Corners gone, and voids.
61	.....	.....	.....	1	.....	157	0	150.82	12.45	12.04	12.00	144.48	260,064	306,100	2,119	
A 50	1	2	4	3	.....	156	12	152.74	12.45	11.85	12.02	142.44	374,000	405,500	2,847	
51	.....	.....	.....	3	.....	150	8	148.95	12.32	11.84	11.97	141.72	342,600	342,600	2,417	
52	.....	.....	.....	3	.....	160	12	158.22	12.59	12.00	12.00	144.00	401,000	401,000	2,785	
63	.....	.....	.....	3	.....	156	4	158.22	12.11	12.15	11.90	144.58	358,000	396,100	2,740	
64	.....	.....	.....	3	.....	155	8	151.83	12.30	12.04	11.95	143.88	360,000	380,400	2,644	
65	.....	.....	.....	3	.....	157	4	152.40	12.32	12.10	11.96	144.72	308,000	402,000	2,778	

A 47	1	2	4	6	.....	155	4	151.32	12.18	12.13	12.00	145.56	516,000	570,800	3,921	
59	.....	.....	.....	6	.....	157	12	152.01	12.35	12.02	12.08	145.20	425,000	493,000	3,395	
60	.....	.....	.....	6	.....	155	0	150.72	12.30	12.08	11.96	144.48	520,128	572,000	3,959	
62	.....	.....	.....	6	.....	147	12	.....	12.17	12.00	12.16	145.92	378,000	417,100	2,858	Corners gone, and voids
66	.....	.....	.....	6	.....	153	4	149.45	12.44	11.94	11.93	142.44	411,000	499,800	3,509	
67	.....	.....	.....	6	.....	153	4	150.02	12.33	11.96	11.97	143.16	415,000	489,000	3,416	
A 18	1	3	6	.....	7	.....	.....	.....	12.09	11.94	12.10	144.47	168,400	200,300	1,386	Large and numerous voids.
19	.....	.....	.....	.....	7	.....	.....	.....	12.26	11.95	12.10	144.60	219,000	270,600	1,871	Voids.
20	.....	.....	.....	.....	7	.....	.....	.....	12.19	12.06	12.06	145.44	252,000	297,200	2,043	
21	.....	.....	.....	.....	7	.....	.....	.....	12.17	12.10	11.99	145.08	280,000	310,700	2,142	
22	.....	.....	.....	.....	9	.....	.....	.....	12.15	11.99	12.12	145.32	282,512	335,400	2,308	
A 1	1	3	6	1	.....	.....	.....	.....	12.25	12.18	11.99	146.04	395,000	437,900	2,998	Voids at corners.
5	.....	.....	.....	1	.....	.....	.....	.....	12.12	11.93	12.17	145.19	358,000	401,800	2,767	Small voids at corners.
6	.....	.....	.....	1	.....	.....	.....	.....	12.10	12.17	11.92	145.07	331,000	354,000	2,440	Corners gone.
7	.....	.....	.....	1	.....	.....	.....	.....	12.14	12.38	12.00	148.56	359,000	371,000	2,497	Voids.
10	.....	.....	.....	1	.....	.....	.....	.....	12.09	11.85	12.40	146.94	301,000	309,200	2,104	Do.
15	.....	.....	.....	1	.....	151	4	149.26	12.15	12.05	11.96	144.12	317,064	374,712	2,600	
A 2	1	3	6	3	.....	157	4	151.40	12.29	12.20	11.97	146.08	435,000	500,200	3,425	
3	.....	.....	.....	3	.....	154	8	151.72	12.12	11.95	12.15	145.19	365,000	447,000	3,079	
9	.....	.....	.....	3	.....	151	0	146.59	12.16	11.93	12.27	146.38	299,000	368,500	2,517	Do.
11	.....	.....	.....	3	.....	153	0	149.17	12.16	12.30	11.85	145.75	338,000	362,800	2,489	Do.
13	.....	.....	.....	3	.....	157	8	149.67	12.37	12.02	12.23	147.00	367,000	437,600	2,977	Do.
17	.....	.....	.....	3	.....	158	8	151.84	12.28	12.20	12.04	146.89	323,158	412,000	2,805	
A 4	1	3	6	6	.....	154	4	151.11	12.18	11.90	12.17	144.82	563,000	600,800	4,148	Voids at corners.
8	.....	.....	.....	6	.....	153	12	149.80	12.18	12.34	11.80	145.61	505,000	555,100	3,812	Voids.
12	.....	.....	.....	6	.....	149	12	.....	12.25	12.30	12.02	147.85	349,000	375,500	2,540	Do.
14	.....	.....	.....	6	.....	153	4	150.24	12.14	12.14	11.96	145.19	406,532	543,500	3,743	
16	.....	.....	.....	6	.....	152	8	148.15	12.18	11.98	12.19	146.04	396,000	524,500	3,591	
A 40	1	6	12	.....	7	.....	.....	.....	11.92	12.00	12.26	147.12	52,000	98,100	667	
41	.....	.....	.....	.....	7	.....	.....	.....	12.10	11.91	12.25	145.90	78,000	91,700	628	Voids, and corners gone.
42	.....	.....	.....	.....	7	.....	.....	.....	12.16	12.19	11.91	145.18	62,000	98,500	678	Do.
43	.....	.....	.....	.....	7	.....	.....	.....	12.08	11.94	12.12	144.71	74,000	87,800	607	Do.
44	.....	.....	.....	.....	9	.....	.....	.....	12.11	12.01	12.00	144.12	72,060	114,600	795	
A 23	1	6	12	1	.....	.....	.....	.....	12.00	11.96	12.04	144.00	97,000	103,200	717	Corners gone.
30	.....	.....	.....	1	.....	.....	.....	.....	12.30	12.12	12.01	145.56	114,600	116,000	797	Corners gone; in bad order.
31	.....	.....	.....	1	.....	.....	.....	.....	12.40	12.21	11.79	143.96	99,000	103,600	720	Do.
34	.....	.....	.....	1	.....	.....	.....	.....	12.38	11.87	12.30	146.00	114,000	118,500	812	Do.
36	.....	.....	.....	1	.....	.....	.....	.....	12.46	12.05	12.28	147.97	107,700	129,000	872	Do.
37	.....	.....	.....	1	.....	.....	.....	.....	12.45	11.96	12.11	144.84	115,872	127,500	880	
A 24	1	6	12	3	.....	146	12	.....	12.47	12.10	11.89	143.87	165,000	179,200	1,246	Corners gone.
25	.....	.....	.....	3	.....	140	8	.....	12.50	12.12	11.98	145.20	146,000	151,500	1,043	Do.
28	.....	.....	.....	3	.....	144	8	.....	12.48	12.16	11.99	145.80	162,400	162,400	1,114	Voids, and corners gone.
32	.....	.....	.....	3	.....	146	12	.....	12.51	12.20	11.92	145.42	160,000	176,000	1,210	Corners gone; in bad order.
33	.....	.....	.....	3	.....	142	0	.....	12.31	12.22	11.98	146.40	158,000	161,700	1,104	Do.
39	.....	.....	.....	3	.....	132	8	.....	12.00	12.02	12.18	146.40	154,000	154,000	1,052	Corners gone; voids.

CONCRETE CUBES MADE OF SAYLOR'S PORTLAND CEMENT—Continued.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	Days.	Pounds.	Ounces.	Pounds.	Inches.	Inches.	Inches.	Sq. inches.	Pounds.	Pounds.	Pounds.	
A 26	1	6	12	6	.....	144	0	.....	12.43	12.17	11.91	144.94	226,000	239,800	1,654	Voids; corners gone.
27	.....	.....	.....	6	.....	13	4	.....	12.42	11.90	12.16	144.70	179,000	190,000	1,313	Do.
29	.....	.....	.....	6	.....	14	(	.....	12.41	11.84	12.13	143.62	210,000	231,000	1,608	Do.
35	.....	.....	.....	6	.....	148	0	.....	12.48	12.27	11.87	145.64	208,000	214,200	1,471	Corners gone; in bad order.
38	.....	.....	.....	6	.....	140	8	.....	12.03	12.16	12.05	146.53	229,000	244,000	1,665	Corners gone; voids.

CONCRETE CUBES MADE OF ATLAS PORTLAND CEMENT.

B 44	1	2	4	.....	7	151	12	151.88	12.07	11.91	12.01	143.04	189,000	203,600	1,423	
45	.....	.....	.....	.....	7	150	8	151.51	12.01	11.95	11.96	142.92	182,000	199,900	1,399	
46	.....	.....	.....	.....	7	150	8	150.76	12.09	11.92	11.97	142.68	182,500	189,800	1,330	
47	.....	.....	.....	.....	7	147	8	147.28	12.20	11.94	11.88	141.85	146,000	154,600	1,090	
49	.....	.....	.....	.....	8	150	12	151.01	12.06	11.90	12.02	143.04	200,256	242,400	1,695	
B 50	1	2	4	1	.....	153	0	150.98	12.04	12.09	12.03	145.44	332,500	332,500	2,286	
54	.....	.....	.....	1	.....	153	12	150.70	12.27	12.07	11.90	143.63	318,500	318,500	2,217	
55	.....	.....	.....	1	.....	157	12	154.01	12.17	12.10	12.02	145.44	353,000	379,000	2,606	
56	.....	.....	.....	1	.....	156	0	152.56	12.18	12.02	12.07	145.08	332,000	364,000	2,509	
57	.....	.....	.....	1	.....	154	12	152.59	12.18	12.04	11.95	143.88	342,000	371,100	2,579	
60	.....	.....	.....	1	.....	152	12	151.11	12.08	12.00	12.10	145.20	319,440	344,500	2,373	
B 52	1	2	4	3	.....	154	0	151.58	12.13	12.07	11.99	144.72	458,000	461,000	3,185	
58	.....	.....	.....	3	.....	153	0	152.62	12.03	12.00	12.00	144.00	399,000	443,500	3,080	
59	.....	.....	.....	3	.....	153	8	152.74	12.01	12.04	12.01	144.60	441,000	449,700	3,110	
63	.....	.....	.....	3	.....	154	4	149.47	12.14	12.10	12.14	146.89	413,000	415,100	2,826	Voids.
65	.....	.....	.....	3	.....	159	0	147.74	12.62	12.26	12.02	147.36	393,800	394,200	2,675	
66	.....	.....	.....	3	.....	158	12	150.16	12.46	11.94	12.28	146.62	410,536	428,000	2,918	
B 48	1	2	4	6	.....	154	8	152.22	12.19	12.00	11.99	143.88	552,000	614,000	4,267	
51	.....	.....	.....	6	.....	149	4	148.79	12.18	11.80	12.06	142.31	476,000	520,000	3,654	Do.
53	.....	.....	.....	6	.....	152	4	151.64	12.11	11.85	12.09	143.27	572,000	574,000	4,006	
61	.....	.....	.....	6	.....	154	4	152.35	12.11	11.92	12.12	144.47	537,000	571,000	3,952	
62	.....	.....	.....	6	.....	156	0	150.06	12.21	12.20	12.06	147.13	550,000	588,250	4,000	
64	.....	.....	.....	6	.....	155	0	150.00	12.38	12.09	11.99	144.96	413,000	556,200	3,837	Do.

B 16	1	8	6	.....	7	155	4	152.98	12.28	11.94	11.96	142.80	118,000	143,800	1,007	
17	.....	.....	.....	.....	7	153	0	153.53	12.14	11.96	11.86	141.85	116,000	136,100	959	
18	.....	.....	.....	.....	7	153	4	152.12	12.16	12.00	11.93	143.16	127,000	160,400	1,120	
19	.....	.....	.....	.....	7	148	0	.....	11.96	11.98	12.05	144.36	110,000	127,500	883	Corners gone; voids.
15	.....	.....	.....	.....	8	153	0	150.89	12.28	11.95	11.94	142.68	142,680	183,100	1,283	
B 2	1	8	6	1	.....	158	8	151.87	12.40	12.07	12.05	145.44	221,000	267,300	1,838	
4	.....	.....	.....	1	.....	159	0	149.78	12.65	11.91	12.18	145.06	245,000	258,300	1,746	
5	.....	.....	.....	1	.....	159	12	150.53	12.62	11.98	12.18	145.31	219,000	241,900	1,665	
7	.....	.....	.....	1	.....	160	4	150.11	12.61	12.04	12.15	146.29	239,000	249,500	1,705	
12	.....	.....	.....	1	.....	157	4	151.29	12.37	12.00	12.10	145.20	231,000	268,100	1,846	
14	.....	.....	.....	1	.....	157	8	151.18	12.46	12.00	12.04	144.48	260,064	308,000	2,097	
B 6	1	8	6	3	.....	158	8	152.88	12.39	11.98	12.16	145.07	359,000	379,000	2,618	
8	.....	.....	.....	3	.....	158	12	152.33	12.55	11.81	12.15	143.49	372,000	375,000	2,613	
9	.....	.....	.....	3	.....	157	4	152.15	12.27	11.98	12.20	145.55	370,000	407,540	2,800	
13	.....	.....	.....	3	.....	149	4	.....	12.45	11.96	12.08	143.76	362,000	381,500	2,654	
20	.....	.....	.....	3	.....	144	8	.....	12.04	12.01	11.89	142.80	311,000	311,000	2,178	Corners gone.
21	.....	.....	.....	3	.....	152	4	150.61	12.09	11.98	12.06	144.48	342,000	342,000	2,367	
B 1	1	8	6	6	.....	154	8	151.47	12.25	12.00	11.99	143.88	418,000	463,800	3,224	
3	.....	.....	.....	6	.....	156	4	150.35	12.43	11.91	12.13	144.47	373,000	451,000	3,122	
10	.....	.....	.....	6	.....	160	0	151.34	12.50	11.98	12.22	146.15	405,000	475,800	3,256	
11	.....	.....	.....	6	.....	159	0	151.21	12.60	12.19	11.83	144.21	306,000	437,000	3,030	
22	.....	.....	.....	6	.....	150	12	.....	12.09	12.01	12.00	144.12	418,000	464,000	3,220	
B 37	1	6	12	.....	7	.....	.....	.....	12.13	11.98	12.09	144.23	55,400	77,900	540	Corners gone, and voids.
38	.....	.....	.....	.....	7	.....	.....	.....	12.19	11.98	12.10	144.96	55,200	89,500	617	Do.
39	.....	.....	.....	.....	7	.....	.....	.....	12.25	12.00	12.12	145.44	82,000	94,000	646	Do.
41	.....	.....	.....	.....	7	.....	.....	.....	12.25	12.02	12.22	146.88	66,000	76,800	523	Do.
40	.....	.....	.....	.....	8	.....	.....	.....	12.32	12.01	12.20	146.52	57,000	94,100	642	Do.
B 23	1	6	12	1	.....	145	0	.....	12.08	11.97	12.17	145.67	177,000	184,000	1,263	Do.
24	.....	.....	.....	1	.....	148	12	.....	12.28	12.00	12.21	146.52	159,000	187,800	1,282	Do.
29	.....	.....	.....	1	.....	131	12	.....	12.08	12.25	11.81	144.67	116,800	124,100	858	Do.
30	.....	.....	.....	1	.....	149	0	.....	12.58	12.30	11.99	147.48	129,000	168,700	1,144	Do.
32	.....	.....	.....	1	.....	139	0	.....	12.32	11.82	12.17	143.85	106,000	128,500	898	Do.
34	.....	.....	.....	1	.....	142	4	.....	12.29	12.00	12.17	146.04	146,040	160,644	1,100	
B 25	1	6	12	3	.....	145	8	.....	12.28	12.26	12.00	147.12	169,500	170,200	1,157	Do.
31	.....	.....	.....	3	.....	145	12	.....	12.32	11.98	12.20	145.55	199,000	208,600	1,399	Do.
35	.....	.....	.....	3	.....	137	0	.....	12.50	12.22	11.98	146.40	117,000	117,000	799	Do.
36	.....	.....	.....	3	.....	147	0	.....	12.37	12.00	12.17	146.04	160,644	193,400	1,324	Do.
42	.....	.....	.....	3	.....	145	0	.....	12.37	11.98	12.26	146.87	177,000	190,100	1,294	Do.
43	.....	.....	.....	3	.....	140	0	.....	12.25	11.93	12.27	146.38	172,000	180,300	1,232	Do.
B 26	1	6	12	6	.....	142	0	.....	12.15	11.84	12.32	145.87	210,000	211,500	1,450	Do.
27	.....	.....	.....	6	.....	139	8	.....	12.11	12.31	11.86	146.00	216,000	229,000	1,568	Do.
28	.....	.....	.....	6	.....	142	0	.....	12.07	12.21	11.94	145.79	252,000	261,756	1,795	Do.
33	.....	.....	.....	6	.....	144	8	.....	12.44	12.20	12.00	146.40	207,500	222,100	1,517	Do.

CONCRETE CUBES MADE OF ALPHA PORTLAND CEMENT.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
C 69	1	0	2	.....	7	157	12	151.77	12.38	12.11	11.98	145.08	345,000	480,800	3,314	
70	.....	.....	.....	.....	7	157	8	152.22	12.49	11.84	12.09	143.15	369,000	475,100	3,319	
71	.....	.....	.....	.....	7	161	8	153.04	12.59	12.08	12.04	144.84	374,000	481,200	3,322	
72	.....	.....	.....	.....	7	161	0	151.92	12.56	12.08	12.12	145.80	416,000	481,700	3,304	
73	.....	.....	.....	.....	7	160	12	152.83	12.55	11.90	12.17	144.82	347,568	465,000	3,211	
C 74	1	0	2	1	.....	150	4	151.52	12.04	12.00	11.86	142.32	651,000	800,000	5,621	Sustained maximum load one-half minute, then failed.
75	.....	.....	.....	1	.....	155	12	152.50	12.39	11.98	11.94	142.44	589,000	729,100	5,119	
77	.....	.....	.....	1	.....	160	0	152.69	12.45	12.06	12.06	145.44	658,000	738,100	5,075	
78	.....	.....	.....	1	.....	159	8	152.83	12.40	12.10	12.02	145.44	633,000	752,500	5,174	
79	.....	.....	.....	1	.....	155	0	150.87	12.38	11.95	12.00	143.40	506,000	654,800	4,566	
88	.....	.....	.....	1	.....	158	0	152.31	12.50	11.92	12.08	143.40	516,240	683,500	4,766	
C 81	1	0	2	3	.....	159	12	153.59	12.45	12.01	12.02	144.36	598,000	784,000	5,084	
82	.....	.....	.....	3	.....	156	4	151.81	12.33	12.00	12.02	144.24	506,000	754,300	5,229	
85	.....	.....	.....	3	.....	155	4	151.95	12.58	11.84	11.90	140.90	508,000	709,000	5,032	
87	.....	.....	.....	3	.....	156	12	151.69	12.28	11.89	12.28	145.41	465,812	704,000	4,841	
C 53	1	2	4	.....	7	144	12	145.89	12.18	11.85	11.92	141.25	116,000	126,900	898	
54	.....	.....	.....	.....	7	147	0	147.38	12.10	11.95	11.92	142.44	102,000	116,800	816	
55	.....	.....	.....	.....	7	145	0	145.61	12.05	12.00	11.90	142.80	121,000	132,700	929	
56	.....	.....	.....	.....	7	147	12	148.00	12.05	11.98	12.00	143.16	122,000	131,200	916	
57	.....	.....	.....	.....	7	147	8	147.88	12.07	11.94	11.96	142.80	99,960	137,400	962	
C 47	1	2	4	1	.....	147	8	145.50	12.38	11.82	12.02	142.07	342,600	342,600	2,411	
48	.....	.....	.....	1	.....	146	0	144.84	12.26	11.89	12.04	142.07	306,000	333,200	2,345	
50	.....	.....	.....	1	.....	141	12	146.98	12.05	11.88	11.92	141.01	354,500	354,500	2,514	
58	.....	.....	.....	1	.....	146	0	145.54	12.18	11.90	11.98	142.52	345,600	345,600	2,428	
64	.....	.....	.....	1	.....	149	8	146.88	12.39	11.98	11.85	141.96	317,200	317,200	2,234	
66	.....	.....	.....	1	.....	149	0	145.02	12.34	11.97	12.02	143.88	343,000	372,700	2,590	
C 46	1	2	4	3	.....	150	12	147.20	12.30	11.98	12.01	143.88	395,000	426,800	2,966	
59	.....	.....	.....	3	.....	146	12	148.01	12.15	11.87	11.88	141.01	443,000	443,000	3,142	
60	.....	.....	.....	3	.....	148	0	147.27	12.11	12.01	11.94	143.40	414,000	451,200	3,146	
61	.....	.....	.....	3	.....	147	0	147.28	12.19	11.90	11.89	141.49	499,000	514,000	3,633	
62	.....	.....	.....	3	.....	150	12	148.55	12.27	11.97	11.94	142.92	457,344	461,000	3,226	
65	.....	.....	.....	3	.....	144	4	.....	12.18	11.88	11.90	141.37	352,000	371,000	2,624	Corner gone.

C 63	1	2	4	6	.....	150	4	146.70	12.27	12.00	12.02	144.24	419,000	514,600	3,568	
90	.....	.....	.....	6	.....	151	0	151.64	12.07	11.92	11.96	142.56	518,000	691,000	4,847	
91	.....	.....	.....	6	.....	154	0	151.22	12.16	12.04	12.02	144.72	628,100	680,200	4,700	
92	.....	.....	.....	6	.....	152	0	151.13	12.09	11.90	12.08	143.75	612,000	651,000	4,529	
C 10	1	3	6	.....	7	.....	.....	.....	12.24	11.83	11.95	141.37	83,000	98,200	695	Corners gone.
11	.....	.....	.....	.....	7	.....	.....	.....	12.27	11.95	11.97	143.04	111,000	120,400	842	Defective specimen, cracked before testing.
13	.....	.....	.....	.....	7	.....	.....	.....	12.35	11.92	12.09	144.11	120,000	146,400	1,016	
14	.....	.....	.....	.....	7	.....	.....	.....	12.39	11.90	12.01	142.92	128,000	144,800	1,018	
C 4	1	3	6	1	.....	147	4	.....	12.40	11.91	11.90	141.73	237,000	267,400	1,887	Corners gone.
5	.....	.....	.....	1	.....	148	12	146.97	12.35	11.90	11.90	141.61	284,000	326,200	2,304	
8	.....	.....	.....	1	.....	148	0	146.82	12.28	11.92	11.90	141.85	255,000	291,000	2,051	
9	.....	.....	.....	1	.....	149	12	.....	12.40	11.96	12.04	144.00	281,000	309,000	2,146	
22	.....	.....	.....	1	.....	143	4	142.78	12.12	11.92	12.00	143.04	286,080	338,100	2,364	
C 6	1	3	6	3	.....	145	12	145.68	12.27	11.85	11.89	140.90	345,500	367,000	2,605	
15	.....	.....	.....	3	.....	140	12	141.47	12.10	11.85	11.99	142.06	233,000	265,100	1,866	
17	.....	.....	.....	3	.....	137	8	.....	12.24	11.82	12.03	142.19	229,000	275,200	1,935	Corner gone.
18	.....	.....	.....	3	.....	143	0	140.23	12.32	12.07	11.85	143.03	292,000	332,100	2,322	
20	.....	.....	.....	3	.....	143	8	142.46	12.23	11.86	12.00	142.32	323,000	359,000	2,522	
21	.....	.....	.....	3	.....	149	4	145.48	12.25	12.08	11.98	144.72	347,328	416,800	2,880	
C 1	1	3	6	6	.....	148	12	147.56	12.22	11.88	12.00	142.56	302,000	439,200	3,081	
2	.....	.....	.....	6	.....	149	12	147.79	12.20	11.99	11.97	143.52	321,000	388,800	2,709	
3	.....	.....	.....	6	.....	148	4	146.09	12.28	11.98	11.97	142.80	340,000	375,200	2,627	
19	.....	.....	.....	6	.....	147	8	143.22	12.40	11.96	12.00	143.52	336,000	371,000	2,585	
C 36	1	6	12	.....	7	.....	.....	.....	12.25	12.11	11.96	144.71	65,000	76,100	526	Corners gone, compressed surface defective.
37	.....	.....	.....	.....	7	.....	.....	.....	12.35	11.90	12.11	144.12	61,000	71,100	493	Do.
38	.....	.....	.....	.....	7	151	0	142.15	12.60	12.13	12.01	145.68	89,000	93,200	640	
39	.....	.....	.....	.....	7	.....	.....	.....	12.25	12.12	11.81	143.14	63,000	71,000	496	Corners gone, end surface in part gone.
40	.....	.....	.....	.....	7	.....	.....	.....	12.50	11.99	12.03	144.24	83,000	96,000	666	
C 23	1	6	12	1	.....	148	8	.....	12.33	12.12	11.95	144.83	175,000	179,300	1,238	Corners gone.
25	.....	.....	.....	1	.....	143	8	.....	12.75	12.03	12.11	145.68	106,800	106,800	733	Corners gone. In bad order.
29	.....	.....	.....	1	.....	138	8	.....	12.20	12.00	11.95	143.40	170,000	176,900	1,234	Corners gone, voids.
30	.....	.....	.....	1	.....	138	8	.....	12.08	11.99	12.05	144.48	161,000	166,400	1,152	Do.
31	.....	.....	.....	1	.....	139	0	139.46	12.00	12.03	11.93	143.52	181,000	208,400	1,452	
32	.....	.....	.....	1	.....	144	4	.....	12.37	12.03	11.96	143.88	210,600	216,000	1,501	Voids.
C 27	1	6	12	3	.....	141	12	.....	12.73	12.06	12.08	145.68	160,000	170,700	1,172	Corners gone, voids.
28	.....	.....	.....	3	.....	141	4	.....	12.62	12.09	12.00	145.08	149,500	151,800	1,046	Do.
33	.....	.....	.....	3	.....	128	0	.....	12.30	11.96	11.87	141.96	97,000	131,500	926	Do.
35	.....	.....	.....	3	.....	142	4	.....	12.41	12.02	11.97	143.88	184,800	184,800	1,284	Voids.
41	.....	.....	.....	3	.....	147	12	.....	12.54	12.08	11.92	143.99	206,000	206,900	1,437	Voids, corners gone.
42	.....	.....	.....	3	.....	148	4	145.17	12.42	11.82	12.02	142.08	227,328	238,200	1,677	

CONCRETE CUBES MADE OF ALPHA PORTLAND CEMENT—Continued.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
C 24	1	6	12	6	.....	142	12	.....	12.53	11.98	12.15	145.56	205,000	205,000	1,408	Voids
26	.....	.....	.....	6	.....	142	12	.....	12.60	12.08	11.90	143.75	198,500	198,500	1,381	Corners gone, voids.
34	.....	.....	.....	6	.....	132	12	.....	12.24	11.98	11.95	143.16	184,000	184,000	1,285	Do.
43	.....	.....	.....	6	.....	150	8	144.34	12.46	12.05	12.00	144.60	260,280	297,100	2,055	

CONCRETE CUBES MADE OF GERMANIA PORTLAND CEMENT.

D 72	1	0	2	.....	7	149	4	147.78	12.17	12.08	11.92	143.40	357,000	390,500	2,723	
73	.....	.....	.....	.....	7	149	12	148.15	12.18	11.95	12.00	143.40	359,000	398,400	2,778	
74	.....	.....	.....	.....	7	148	12	148.14	12.10	11.96	11.99	143.40	330,000	399,800	2,788	
75	.....	.....	.....	.....	7	148	8	147.53	12.06	11.98	12.09	144.23	341,000	395,400	2,741	
76	.....	.....	.....	.....	7	148	8	148.12	12.08	12.00	12.00	144.00	316,800	379,900	2,638	
D 67	1	0	2	1	.....	151	12	149.52	12.23	12.02	11.98	143.40	344,160	516,240	3,600	
68	.....	.....	.....	1	.....	151	8	149.27	12.20	12.02	11.96	143.76	426,000	498,800	3,435	
69	.....	.....	.....	1	.....	150	4	148.52	12.16	12.01	11.97	143.76	398,000	458,400	3,189	
70	.....	.....	.....	1	.....	154	0	150.50	12.29	12.07	11.92	143.87	409,000	463,500	3,222	
71	.....	.....	.....	1	.....	152	12	149.31	12.39	11.99	11.90	142.68	439,000	488,500	3,424	
77	.....	.....	.....	1	.....	148	12	147.55	12.22	11.86	12.02	142.56	318,600	371,600	2,607	
D 78	1	0	2	3	.....	152	8	149.39	12.25	12.03	11.97	144.00	328,000	548,300	3,808	
79	.....	.....	.....	3	.....	150	0	150.00	12.05	11.92	12.08	143.40	397,000	575,500	4,013	
80	.....	.....	.....	3	.....	152	8	150.99	12.08	12.04	12.00	144.48	336,000	549,000	3,800	
81	.....	.....	.....	3	.....	152	0	149.25	12.13	12.05	12.04	145.08	340,000	561,300	3,869	
82	.....	.....	.....	3	.....	152	4	150.13	12.19	12.00	11.98	143.76	373,776	546,288	3,800	
D 107	1	0	2	6	.....	151	8	152.54	11.90	11.88	12.14	144.22	581,000	727,500	5,044	
108	.....	.....	.....	6	.....	151	0	151.28	11.82	12.16	12.00	145.92	618,000	752,500	5,157	
109	.....	.....	.....	6	.....	150	0	153.07	11.78	11.90	12.08	143.75	651,000	810,200	5,636	
110	.....	.....	.....	6	.....	145	8	150.11	11.78	11.78	12.07	142.18	526,000	686,500	4,828	
111	.....	.....	.....	6	.....	150	8	149.68	11.95	12.04	12.08	145.44	552,672	724,000	4,978	
D 55	1	2	4	.....	7	152	8	148.78	12.48	11.91	11.92	141.97	265,000	302,100	2,127	
56	.....	.....	.....	.....	7	156	12	148.41	12.58	11.92	12.22	145.66	300,000	309,200	2,128	
57	.....	.....	.....	.....	7	156	4	148.66	12.55	12.09	11.97	144.72	298,000	302,400	2,090	
58	.....	.....	.....	.....	7	152	8	148.09	12.43	11.95	11.98	143.16	313,000	337,200	2,355	
59	.....	.....	.....	.....	7	154	4	149.02	12.31	12.20	11.91	145.30	319,660	348,768	2,400	

D 43	1	2	4	1	.....	157	0	148.92	12.63	11.94	12.08	144.24	370,000	382,100	2,649	
44	.....	.....	.....	1	.....	155	0	148.92	12.50	12.01	11.98	143.88	363,000	369,000	2,565	
62	.....	.....	.....	1	.....	155	4	148.85	12.35	12.11	12.05	145.93	301,000	349,000	2,392	
64	.....	.....	.....	1	.....	154	0	149.64	12.28	12.18	11.89	144.82	376,532	424,800	2,933	
65	.....	.....	.....	1	.....	152	12	148.64	12.23	11.97	12.13	145.20	341,000	390,600	2,690	
66	.....	.....	.....	1	.....	154	0	150.37	12.26	12.11	11.92	144.35	308,000	378,800	2,624	
D 47	1	2	4	3	.....	155	8	149.72	12.36	12.00	12.10	145.20	309,000	458,000	3,154	
48	.....	.....	.....	3	.....	155	4	149.26	12.43	12.10	11.95	144.60	423,000	454,000	3,140	
50	.....	.....	.....	3	.....	155	4	150.23	12.37	11.99	12.04	144.36	399,000	453,500	3,141	
51	.....	.....	.....	3	.....	153	4	150.00	12.25	12.06	11.95	144.12	398,000	450,600	3,127	Voids.
53	.....	.....	.....	3	.....	155	4	149.91	12.50	11.96	11.97	143.16	370,000	452,000	3,157	
61	.....	.....	.....	3	.....	152	12	150.38	12.17	11.93	12.09	144.23	374,000	399,600	2,771	
D 49	1	2	4	6	.....	153	12	149.80	12.42	11.98	11.92	142.80	491,000	589,000	4,125	
91	.....	.....	.....	6	.....	150	0	151.80	12.20	11.80	11.90	140.42	490,000	530,200	3,776	
92	.....	.....	.....	6	.....	152	8	148.78	12.20	12.20	11.90	145.18	439,000	490,000	3,375	
93	.....	.....	.....	6	.....	149	0	149.13	12.08	12.00	11.91	142.92	475,000	518,800	3,690	
96	.....	.....	.....	6	.....	147	8	148.74	12.09	11.92	11.89	141.72	390,000	469,000	3,309	
D 1	1	3	6	.....	7	155	8	148.91	12.50	12.03	12.00	144.36	205,000	227,300	1,575	
5	.....	.....	.....	.....	7	154	12	146.96	12.49	12.00	12.14	145.68	208,000	241,800	1,660	
9	.....	.....	.....	.....	7	158	12	148.84	12.58	11.97	12.24	146.51	190,000	229,400	1,566	
10	.....	.....	.....	.....	7	157	8	148.76	12.60	12.12	11.98	145.20	200,000	227,200	1,565	
11	.....	.....	.....	.....	7	154	0	145.74	12.58	11.87	12.06	143.15	.....	198,400	1,386	
D 4	1	3	6	1	.....	157	0	149.10	12.50	12.01	12.12	145.56	223,000	296,100	2,034	
6	.....	.....	.....	1	.....	155	12	149.05	12.50	12.20	11.84	144.45	265,000	279,000	1,931	
7	.....	.....	.....	1	.....	156	8	146.07	12.46	12.10	12.28	148.59	294,000	334,500	2,251	
12	.....	.....	.....	1	.....	156	8	149.43	12.61	12.00	11.96	143.52	264,000	275,000	1,916	Irregular bed surface.
13	.....	.....	.....	1	.....	156	12	147.61	12.68	12.04	12.02	144.72	341,000	359,200	2,482	
19	.....	.....	.....	1	.....	152	0	148.80	12.30	12.10	11.90	143.99	290,000	350,100	2,431	
D 3	1	3	6	3	.....	155	4	149.42	12.50	12.07	11.90	143.63	312,000	349,800	2,435	
14	.....	.....	.....	3	.....	156	0	149.89	12.52	12.06	11.95	144.12	334,000	365,400	2,535	
16	.....	.....	.....	3	.....	154	0	149.73	12.20	12.09	12.05	145.68	307,000	386,000	2,650	
17	.....	.....	.....	3	.....	153	4	150.49	12.21	11.95	12.06	144.12	317,064	382,000	2,651	
18	.....	.....	.....	3	.....	153	8	149.01	12.30	12.08	11.98	144.72	344,000	382,500	2,643	Voids at corners.
21	.....	.....	.....	3	.....	142	8	.....	12.04	11.82	12.07	142.67	254,000	286,000	2,005	Corners gone and voids.
D 2	1	3	6	6	.....	156	8	145.98	12.70	12.16	12.00	145.92	369,000	385,000	2,636	
8	.....	.....	.....	6	.....	156	4	148.53	12.45	12.28	11.89	146.01	430,000	468,200	3,207	
15	.....	.....	.....	6	.....	150	12	147.80	12.26	12.00	11.98	143.76	388,000	415,200	2,888	Voids.
20	.....	.....	.....	6	.....	150	4	149.25	12.07	12.05	11.96	144.12	390,000	430,600	2,988	Do.
D 24	1	6	12	.....	7	147	0	.....	12.50	11.92	12.09	144.11	98,000	115,400	801	
29	.....	.....	.....	.....	7	141	0	.....	12.39	11.79	12.08	142.42	94,000	101,400	712	Corner gone.
30	.....	.....	.....	.....	7	.....	.....	.....	12.17	11.94	12.05	143.88	109,000	117,800	819	Corners gone.
34	.....	.....	.....	.....	7	.....	.....	.....	12.22	11.98	12.13	145.32	96,000	102,900	708	Do.
35	.....	.....	.....	.....	7	.....	.....	.....	12.13	12.01	12.12	145.56	72,780	109,700	754	Do.

CONCRETE CUBES MADE OF GERMANIA PORTLAND CEMENT—Continued.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds*	*Pounds.*	
D 22	1	6	12	1	.....	144	12	.....	12.56	12.16	11.85	144.10	144,000	166,000	1,152	Corners gone.
27	.....	.....	.....	1	.....	137	12	.....	12.33	12.15	11.90	144.59	119,900	125,000	864	Corners gone; voids.
28	.....	.....	.....	1	.....	145	12	.....	12.45	11.99	12.12	145.32	165,500	178,500	1,228	Do.
31	.....	.....	.....	1	.....	139	8	.....	12.20	12.15	11.90	144.59	144,590	157,300	1,088	Do.
32	.....	.....	.....	1	.....	133	0	.....	12.28	12.13	11.98	145.32	106,000	124,000	853	Corners gone and part of each surface.
33	.....	.....	.....	1	.....	137	0	.....	12.21	12.04	12.08	145.44	107,200	107,200	737	Corners gone; defective end surface.
D 23	1	6	12	3	.....	148	4	141.82	12.42	12.14	11.98	145.44	184,500	184,500	1,269	Voids.
25	.....	.....	.....	3	.....	147	4	.....	12.49	12.04	11.85	142.67	182,000	182,000	1,276	Corner gone.
26	.....	.....	.....	3	.....	149	4	.....	12.56	11.96	12.12	144.96	159,000	179,000	1,235	Corners gone.
36	.....	.....	.....	3	.....	116	4	.....	12.15	12.07	12.00	144.84	83,200	83,200	574	Corners gone; voids.
38	.....	.....	.....	3	.....	128	8	.....	12.28	11.88	12.06	143.27	102,000	104,100	727	Voids.
39	.....	.....	.....	3	.....	129	4	.....	12.20	11.92	12.05	143.64	100,100	100,100	697	Do.
D 37	1	6	12	6	.....	129	0	.....	12.34	12.00	12.11	145.32	121,200	121,200	834	Corners gone; voids.
40	.....	.....	.....	6	.....	132	8	.....	12.23	11.99	11.81	141.60	142,000	155,300	1,097	Voids.
41	.....	.....	.....	6	.....	127	4	.....	12.12	12.08	11.87	142.80	115,000	120,700	845	Voids and corners gone.
42	.....	.....	.....	6	.....	120	4	.....	12.06	12.00	12.04	144.48	70,200	70,200	486	Voids; 40 per cent of bearing surface at one end gone.
D 89	1	6	12	7	.....	119	0	.....	12.35	11.95	11.94	142.68	57,000	57,000	399	About 60 per cent of one bearing surface gone.
90	.....	.....	.....	7	.....	121	0	.....	12.32	11.97	12.02	143.88	54,600	54,600	379	About 40 per cent of one bearing surface gone.

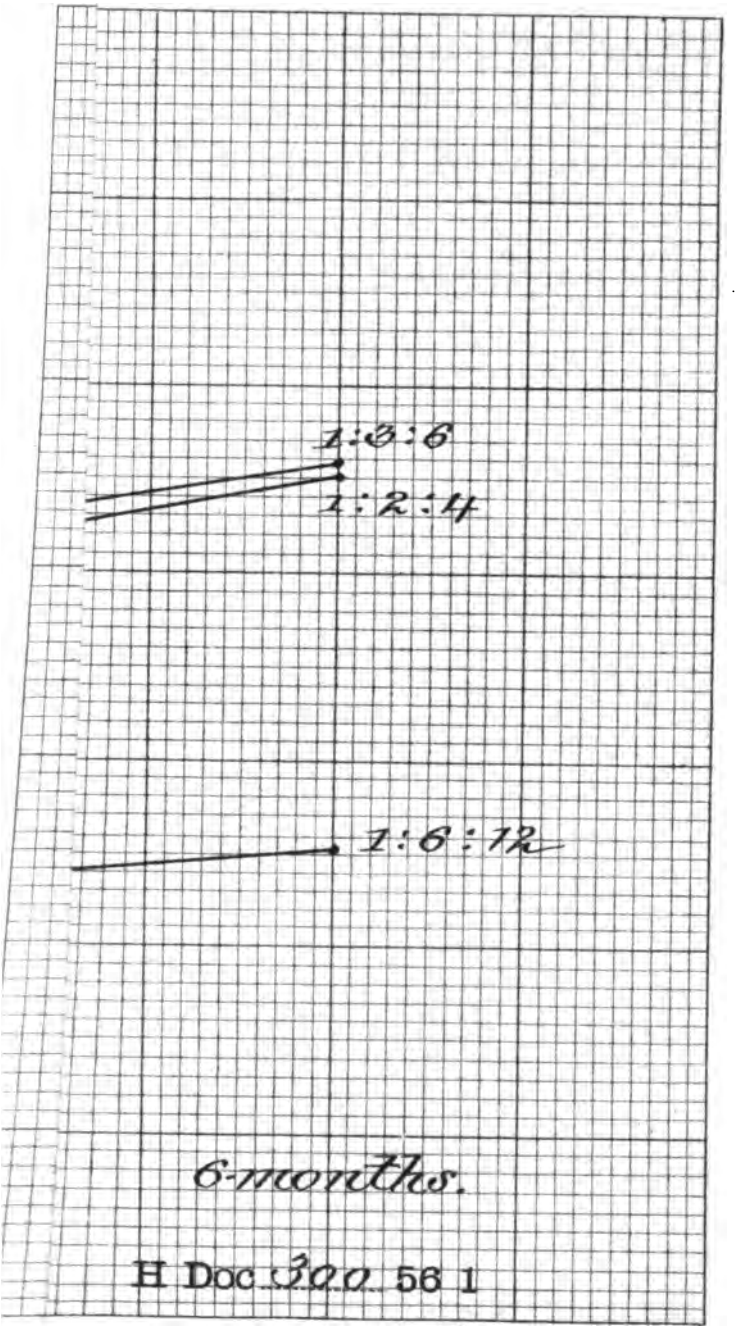
CONCRETE CUBES MADE OF ALSEN'S PORTLAND CEMENT.

E 69	1	0	2	.....	7	147	12	147.63	11.98	12.02	12.01	144.36	356,000	394,000	2,729	
70	.....	.....	.....	.....	7	150	4	148.40	12.19	11.98	11.98	143.52	431,000	489,900	3,413	
71	.....	.....	.....	.....	7	154	4	148.28	12.37	12.11	12.00	145.32	377,000	439,200	3,022	
72	.....	.....	.....	.....	7	155	8	148.28	12.46	12.12	12.00	145.44	415,000	457,400	3,145	
73	.....	.....	.....	.....	10	152	12	147.83	12.43	11.93	12.04	143.64	340,000	471,000	3,279	
E 82	1	0	2	1	.....	151	8	147.29	12.14	12.11	12.09	146.41	322,000	451,600	3,084	
83	.....	.....	.....	1	.....	151	0	148.02	12.11	12.07	12.06	145.56	409,000	445,400	3,060	
84	.....	.....	.....	1	.....	151	12	148.64	12.20	12.07	11.98	144.60	378,000	463,800	3,207	
86	.....	.....	.....	1	.....	152	12	149.37	12.17	12.00	12.10	145.20	365,000	479,000	3,299	
87	.....	.....	.....	1	.....	150	0	147.78	12.18	11.96	12.04	144.00	397,000	485,300	3,370	
88	.....	.....	.....	1	.....	150	0	148.08	12.16	12.05	11.95	144.00	374,400	492,500	3,420	

E 74	1	0	2	3	.....	153	8	149.77	12.34	11.99	11.97	143.52	436,000	558,600	3,892	
75	.....	.....	.....	3	.....	150	8	148.91	12.23	12.00	11.90	142.80	397,000	562,000	3,936	
85	.....	.....	.....	3	.....	152	4	150.52	12.22	11.87	12.05	143.03	314,666	449,700	3,144	
89	.....	.....	.....	3	.....	152	12	149.15	12.30	11.97	12.02	143.88	490,000	556,500	3,868	
E 106	1	0	2	6	.....	147	8	147.14	11.98	12.12	11.93	144.59	556,000	776,200	5,368	
107	.....	.....	.....	6	.....	150	8	147.41	12.14	11.99	12.12	145.32	465,000	748,000	5,147	
108	.....	.....	.....	6	.....	147	4	146.04	11.98	11.98	12.14	145.44	592,000	810,000	5,569	
109	.....	.....	.....	6	.....	149	8	147.30	11.98	11.96	12.24	146.39	410,000	763,800	5,217	
112	.....	.....	.....	6	.....	147	0	147.13	11.94	12.02	12.08	144.60	435,000	775,000	5,360	
E 45	1	2	4	.....	7	150	4	147.55	12.25	11.99	11.98	143.64	231,000	232,700	1,620	
46	.....	.....	.....	.....	7	151	0	147.07	12.30	12.06	11.96	144.24	208,000	219,000	1,518	
47	.....	.....	.....	.....	7	152	4	148.06	12.35	12.00	11.99	143.88	208,000	220,500	1,533	
48	.....	.....	.....	.....	7	150	8	147.55	12.25	12.00	11.99	143.88	192,000	205,500	1,428	
49	.....	.....	.....	.....	10	151	12	147.93	12.31	12.00	12.00	144.00	172,800	268,100	1,862	
E 51	1	2	4	1	.....	153	4	149.73	12.10	12.08	12.10	146.17	286,000	333,600	2,282	
53	.....	.....	.....	1	.....	151	8	147.78	12.19	12.11	12.00	145.32	293,000	308,200	2,121	
54	.....	.....	.....	1	.....	151	4	147.43	12.26	12.00	12.05	144.60	304,000	321,000	2,220	
58	.....	.....	.....	1	.....	149	12	148.64	12.13	11.96	12.00	143.52	305,000	318,800	2,221	
60	.....	.....	.....	1	.....	146	0	144.92	12.16	12.00	11.98	143.16	343,000	343,000	2,396	
67	.....	.....	.....	1	.....	147	4	146.28	12.12	11.96	12.00	143.52	315,744	340,600	2,373	
E 50	1	2	4	3	.....	152	0	148.17	12.30	11.95	12.06	144.12	357,000	368,500	2,557	
52	.....	.....	.....	3	.....	149	4	.....	12.07	11.98	12.09	144.28	318,000	356,700	2,473	Voids.
56	.....	.....	.....	3	.....	150	8	150.01	12.12	11.94	11.98	143.04	343,296	371,904	2,600	
57	.....	.....	.....	3	.....	151	4	147.66	12.21	12.08	12.00	144.96	371,000	386,200	2,664	
59	.....	.....	.....	3	.....	146	12	.....	12.19	12.00	11.94	143.28	390,500	391,000	2,729	
65	.....	.....	.....	3	.....	147	0	.....	12.20	12.20	11.87	144.81	373,000	379,900	2,623	
E 55	1	2	4	6	.....	148	12	148.77	12.15	11.84	12.01	142.20	498,000	517,000	3,636	
90	.....	.....	.....	6	.....	148	0	147.55	11.64	12.01	11.98	143.88	548,000	570,000	3,962	
92	.....	.....	.....	6	.....	145	0	147.94	11.90	11.91	11.95	142.32	471,000	510,000	3,588	
93	.....	.....	.....	6	.....	147	0	147.86	11.98	12.00	11.95	143.40	352,000	441,200	3,077	
94	.....	.....	.....	6	.....	146	0	147.97	11.98	11.94	11.92	142.32	428,000	540,816	3,800	
E 1	1	3	6	.....	7	150	12	147.42	12.24	12.04	11.99	144.36	167,000	189,200	1,311	
2	.....	.....	.....	.....	7	149	12	147.46	12.35	11.94	11.90	142.09	171,000	180,500	1,270	
3	.....	.....	.....	.....	7	153	0	147.91	12.28	12.24	11.94	146.15	181,000	214,000	1,464	
4	.....	.....	.....	.....	7	150	0	147.80	12.20	11.92	12.06	143.75	182,000	198,600	1,382	
5	.....	.....	.....	.....	10	149	8	148.28	12.12	12.10	11.88	143.75	201,250	253,400	1,763	
E 9	1	3	6	1	.....	146	12	149.35	11.85	11.90	12.04	143.28	296,000	315,000	2,198	
12	.....	.....	.....	1	.....	144	0	147.54	11.98	11.89	11.84	140.78	281,000	281,000	1,996	
13	.....	.....	.....	1	.....	147	12	150.25	12.04	11.83	11.98	141.13	298,000	311,500	2,207	
14	.....	.....	.....	1	.....	151	12	148.78	12.20	12.14	11.90	144.47	291,000	300,900	2,083	
19	.....	.....	.....	1	.....	147	4	149.62	12.00	11.97	11.84	141.72	240,000	304,100	2,146	
21	.....	.....	.....	1	.....	145	12	148.71	11.86	11.90	12.00	142.80	272,000	293,000	2,052	

CONCRETE CUBES MADE OF ALSEN'S PORTLAND CEMENT—Continued.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
E 6	1	3	6	3	.....	149	12	147.55	12.22	12.03	11.93	143.52	315,000	323,000	2,251	
7	.....	.....	.....	3	.....	148	8	148.13	12.08	12.00	11.95	143.40	298,000	334,400	2,332	
10	.....	.....	.....	3	.....	145	8	148.71	11.98	11.83	11.93	141.13	291,000	316,500	2,243	
15	.....	.....	.....	3	.....	153	0	149.14	12.25	11.93	12.13	144.71	347,304	331,000	2,288	
16	.....	.....	.....	3	.....	149	8	148.40	12.13	12.06	11.90	143.51	284,500	336,300	2,343	
18	.....	.....	.....	3	.....	147	4	147.01	11.99	11.90	12.13	144.35	278,000	330,600	2,290	
E 8	1	3	6	6	.....	148	0	149.25	12.02	11.93	11.95	142.56	397,000	421,000	2,953	
11	.....	.....	.....	6	.....	147	0	146.89	12.11	12.03	11.87	142.80	370,000	427,000	2,990	
17	.....	.....	.....	6	.....	149	4	147.30	12.14	11.87	12.15	144.22	448,000	451,000	3,127	
20	.....	.....	.....	6	.....	148	0	148.99	12.01	11.90	12.01	142.92	312,000	411,000	2,876	
22	.....	.....	.....	6	.....	146	4	147.24	11.85	12.02	12.05	144.84	430,000	461,000	3,183	
E 23	1	6	12	.....	7	.....	.....	.....	12.32	11.99	12.00	143.88	42,300	43,100	300	Corners gone.
24	.....	.....	.....	.....	7	.....	.....	.....	12.35	12.08	11.86	143.27	63,000	67,600	472	Do.
25	.....	.....	.....	.....	7	.....	.....	.....	12.35	12.04	12.14	146.16	57,800	63,600	435	Do.
27	.....	.....	.....	.....	7	.....	.....	.....	12.16	12.23	11.98	146.51	41,500	45,200	308	Do.
26	.....	.....	.....	.....	10	.....	.....	.....	12.17	11.89	12.11	143.99	67,600	81,800	568	Do.
E 30	1	6	12	1	.....	130	8	.....	12.16	11.99	12.06	144.60	101,200	103,600	716	Corners gone.
32	.....	.....	.....	1	.....	131	8	.....	12.22	11.97	11.93	142.80	102,800	106,600	746	Do.
33	.....	.....	.....	1	.....	128	12	.....	12.10	11.82	11.98	141.60	103,000	106,000	749	Do.
36	.....	.....	.....	1	.....	141	8	.....	12.18	11.96	12.06	144.24	100,968	136,200	944	
37	.....	.....	.....	1	.....	142	0	.....	12.40	12.02	11.90	143.04	141,000	144,000	1,007	
39	.....	.....	.....	1	.....	141	0	.....	12.27	11.98	12.15	145.56	148,500	156,200	1,073	
E 29	1	6	12	3	.....	132	4	.....	12.19	12.09	11.84	143.15	108,400	108,400	757	Voids and corners gone.
31	.....	.....	.....	3	.....	118	12	.....	12.10	11.80	11.97	141.25	82,000	86,200	610	Corners gone.
34	.....	.....	.....	3	.....	135	12	.....	12.24	12.04	11.96	144.00	91,000	121,000	840	Do.
35	.....	.....	.....	3	.....	136	8	.....	12.14	11.98	12.07	144.60	131,000	134,800	932	Do.
41	.....	.....	.....	3	.....	137	4	.....	12.02	11.87	12.08	143.39	157,729	166,100	1,158	Voids.
44	.....	.....	.....	3	.....	132	8	.....	12.37	11.92	12.02	143.40	108,000	109,700	765	Corners gone and voids.
E 28	1	6	12	6	.....	136	8	.....	12.17	11.97	12.15	145.44	182,300	182,300	1,264	Voids.
38	.....	.....	.....	6	.....	142	0	.....	12.29	12.12	12.17	147.50	201,000	226,500	1,536	Do.
40	.....	.....	.....	6	.....	128	12	.....	12.26	11.89	12.06	143.39	158,000	163,600	1,141	Do.
42	.....	.....	.....	6	.....	126	12	.....	12.22	12.00	12.00	144.00	179,000	182,000	1,264	Voids and corners gone.
43	.....	.....	.....	6	.....	138	12	.....	12.14	12.02	11.95	143.64	201,096	204,000	1,420	



6-months.

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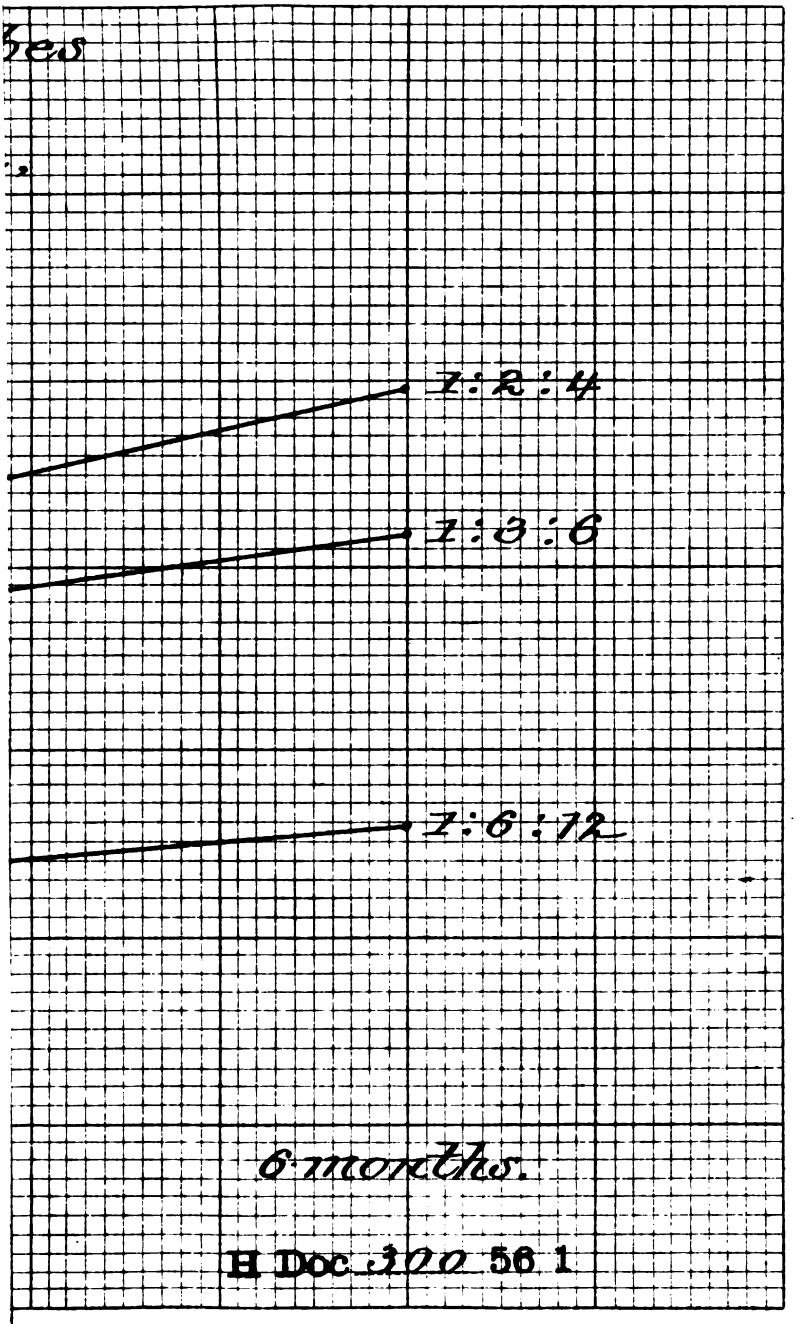

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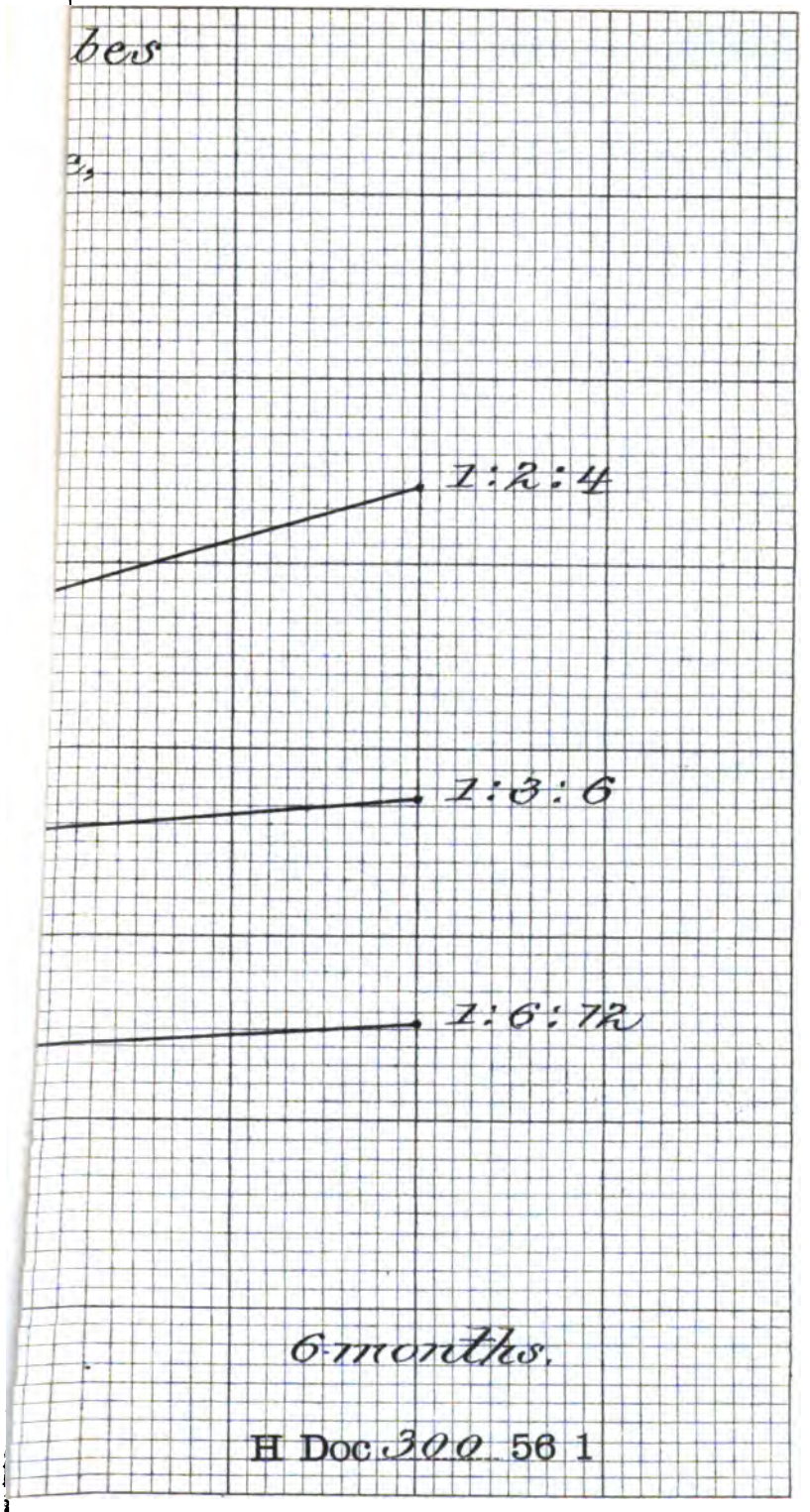

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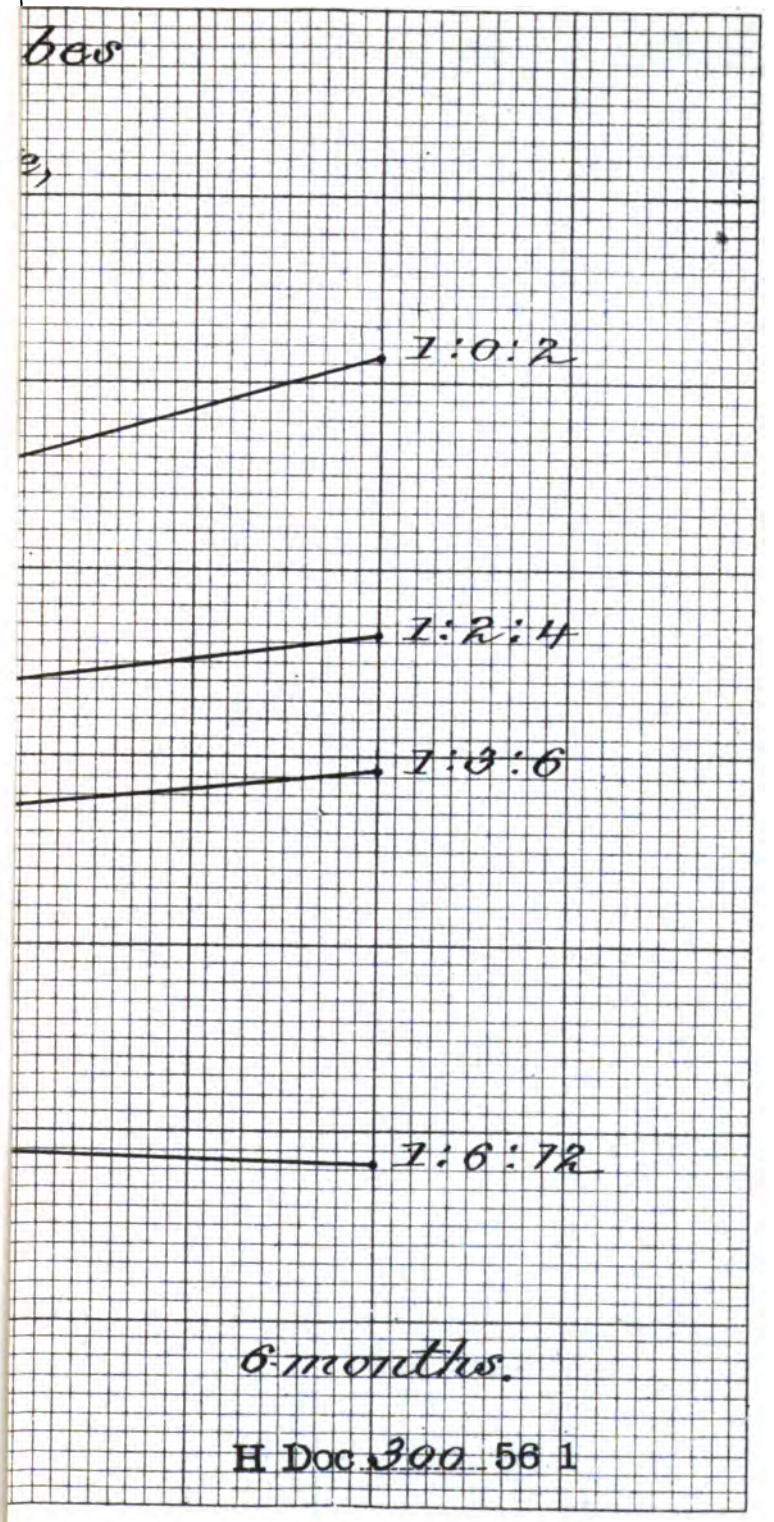

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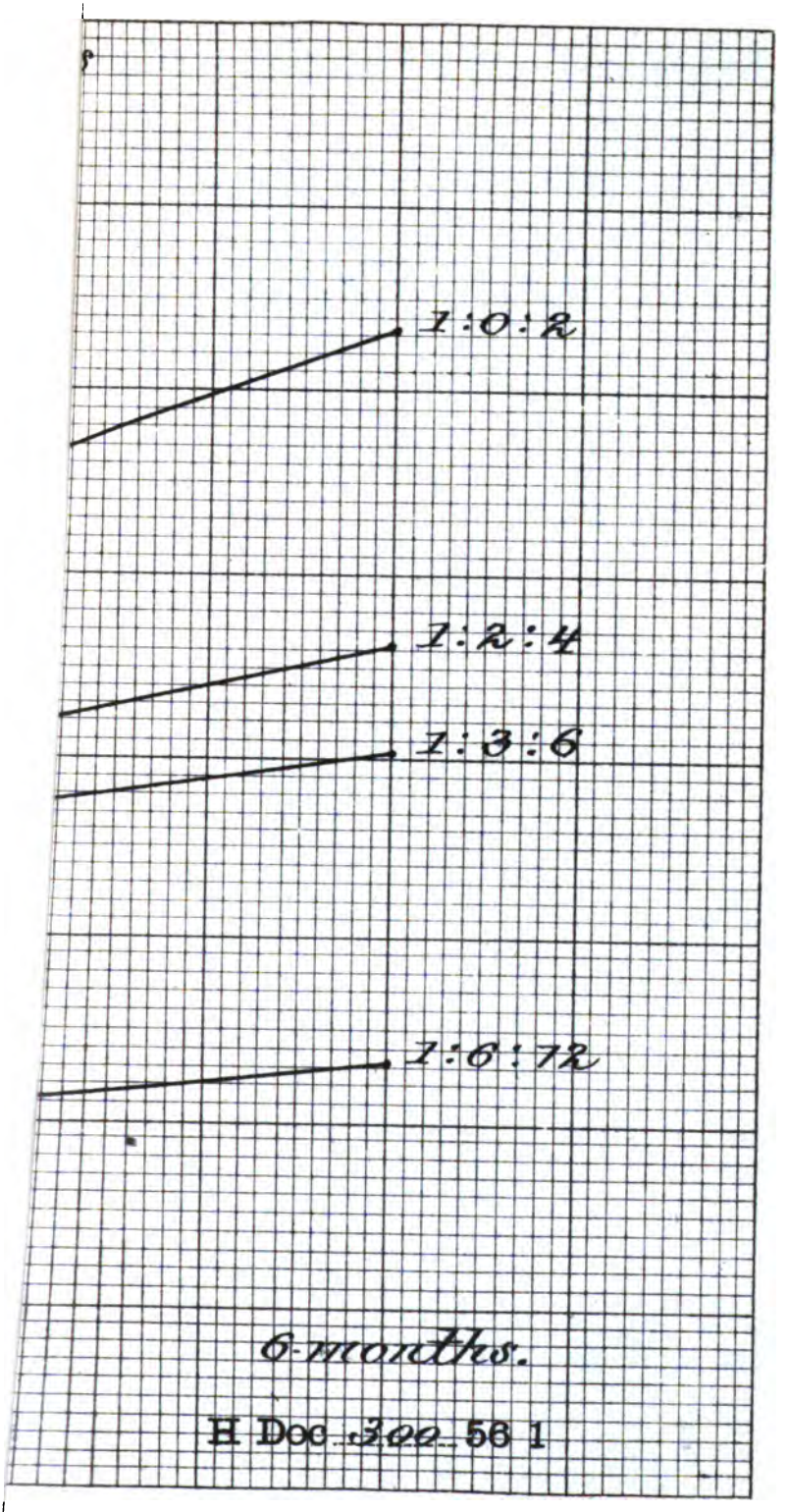

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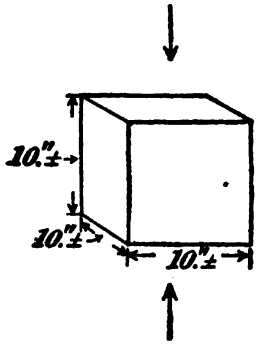
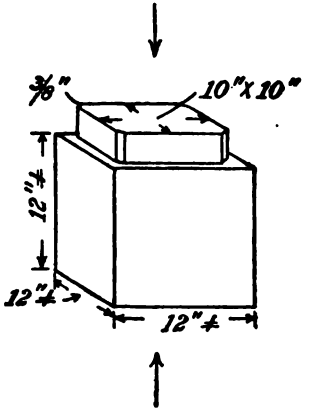
Concrete Cubes Made of Alpha Portland Cement.



Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
C 2	1	0	2	3	.....	87	8	151.11	9.78	10.19	10.04	102.31	285,000	597,100	5,86	
5	.....	.....	.....	3	.....	87	0	150.06	9.88	10.00	10.14	101,40	296,000	544,500	5,370	
8	.....	.....	.....	3	.....	86	4	151.33	9.78	9.97	10.10	100.70	336,000	509,000	5,055	
9	.....	.....	.....	3	.....	87	0	152.06	9.75	10.00	10.14	101.40	347,000	541,400	5,339	
10	.....	.....	.....	3	.....	87	0	151.43	9.80	10.10	10.03	101.30	338,000	589,000	5,814	
12	.....	.....	.....	3	.....	87	4	151.26	9.85	9.96	10.16	101.19	320,000	543,000	5,366	
C 1	1	0	2	6	.....	87	0	150.10	9.80	10.20	10.02	102.20	479,000	708,300	6,980	
3	.....	.....	.....	6	.....	85	8	149.26	9.82	10.04	10.04	100.80	544,320	717,000	7,113	
4	.....	.....	.....	6	.....	87	0	149.17	9.90	10.03	10.15	101.80	514,000	670,000	6,581	
6	.....	.....	.....	6	.....	86	8	150.27	9.80	10.15	10.00	101.50	432,000	634,000	6,246	
7	.....	.....	.....	6	.....	88	0	152.12	9.84	10.19	9.97	101.59	521,000	678,400	6,678	
11	.....	.....	.....	6	.....	87	0	150.09	9.82	10.18	10.02	102.00	442,000	590,500	5,789	

Experiments with Concentrated Stresses.

Loads applied on a 10″ x 10″ plate on one surface of the concrete.



CONCRETE CUBES MADE OF ALPHA PORTLAND CEMENT.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional areas.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surfaces.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
C 76	1	0	2	1	.....	161	4	154.54	12.49	12.00	12.03	144.36	288,000	530,500	3,675	The lower figures in each case in the column of strength per square inch refer to the concentrated surface.
										10.00	10.00	99.72	.....	.....	5,320	
80	1	0	2	1	.....	158	0	158.70	12.45	12.00	11.89	142.68	370,000	510,800	3,580	
										10.00	10.00	99.72	.....	.....	5,122	
86	1	0	2	1	.....	153	4	151.53	12.29	11.97	11.88	142.20	329,000	444,600	3,127	
										10.00	10.00	99.72	.....	.....	4,458	

C 44	1	2	4	1	.....	144	12	145.97	11.90	11.98	12.02	144.00	239,000	284,000	1,972	
										10.00	10.00	99.72	.....	.....	2,848	
49	1	2	4	1	.....	146	4	145.54	12.18	11.92	11.96	142.56	261,900	297,200	2,085	
										10.00	10.00	99.72	.....	.....	2,980	
51	1	2	4	1	.....	148	8	148.26	12.07	11.99	11.96	143.40	241,000	294,800	2,056	
										10.00	10.00	99.72	.....	.....	2,956	
67	1	2	4	1	.....	150	8	148.30	12.26	11.98	11.94	143.04	264,000	265,000	1,858	
										10.00	10.00	99.72	.....	.....	2,657	
C 89	1	2	4	3	.....	150	8	152.78	11.92	11.92	11.98	142.80	331,000	408,200	2,859	
										10.00	10.00	99.72	.....	.....	4,098	
95	1	2	4	3	.....	150	8	149.87	12.02	12.05	11.98	144.36	380,000	380,500	2,636	
										10.00	10.00	99.72	.....	.....	3,816	
97	1	2	4	3	.....	151	4	151.00	12.03	11.99	12.00	143.88	392,000	394,000	2,738	
										10.00	10.00	99.72	.....	.....	3,951	
C 98	1	2	4	6	.....	152	8	151.61	12.08	11.98	12.06	144.48	414,000	513,400	3,553	
										10.00	10.00	99.72	.....	.....	5,148	
94	1	2	4	6	.....	149	0	150.90	11.96	12.09	11.80	142.66	464,000	501,800	3,517	
										10.00	10.00	99.72	.....	.....	5,082	
96	1	2	4	6	.....	149	8	150.50	12.00	11.97	11.95	143.04	460,000	511,000	3,572	
										10.00	10.00	99.72	.....	.....	5,124	

CONCRETE CUBES MADE OF GERMANIA PORTLAND CEMENT.

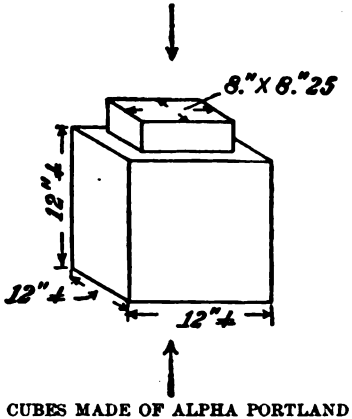
D 84	1	0	2	1	.....	152	12	149.40	12.30	11.92	12.05	143.64	356,000	410,000	2,854	Bearing surface irregular.
										10.00	10.00	99.72	.....	.....	4,112	
87	1	0	2	1	.....	153	4	149.00	12.23	12.04	12.07	145.32	408,000	480,500	2,962	
										10.00	10.00	99.72	.....	.....	4,317	
88	1	0	2	1	.....	154	4	149.00	12.29	12.08	12.10	145.56	405,000	440,400	3,026	
										10.00	10.00	99.72	.....	.....	4,416	
D 45	1	2	4	1	.....	158	12	149.76	12.44	12.26	12.01	147.24	298,000	318,300	2,162	
										10.00	10.00	99.72	.....	.....	3,192	
54	1	2	4	1	.....	154	0	148.83	12.50	11.96	11.96	143.04	326,000	354,000	2,475	
										10.00	10.00	99.72	.....	.....	3,550	
60	1	2	4	1	.....	150	4	145.96	12.20	12.02	12.13	145.80	245,000	299,600	2,055	Voids.
										10.00	10.00	99.72	.....	.....	3,004	
D 94	1	2	4	3	.....	148	0	149.26	11.98	11.83	12.09	143.02	254,000	275,900	1,929	
										10.00	10.00	99.72	.....	.....	2,767	
95	1	2	4	3	.....	146	8	149.10	11.99	11.84	11.96	141.61	218,000	296,500	2,094	
										10.00	10.00	99.72	.....	.....	2,973	
108	1	2	4	3	.....	145	12	146.64	11.84	11.90	12.19	145.06	308,000	317,000	2,185	
										10.00	10.00	99.72	.....	.....	3,179	

CONCRETE CUBES MADE OF GERMANIA PORTLAND CEMENT—Continued.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional areas.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
D 97	1	2	4	6	.....	149	0	147.90	12.10	11.89	12.10	143.87	200,000	363,800	2,529	
										10.00	10.00	99.72	.....	.....	3,648	
98	1	2	4	6	.....	149	0	149.01	11.99	11.89	12.12	144.11	281.000	347,500	2,411	
										10.00	10.00	99.72	.....	.....	3,485	
99	1	2	4	6	.....	149	0	148.76	12.12	12.00	11.90	142.80	376,000	411,800	2,884	
										10.00	10.00	99.72	.....	.....	4,130	
CONCRETE CUBES MADE OF ALSEN'S PORTLAND CEMENT.																
E 79	1	0	2	1	.....	151	0	149.64	12.08	11.92	12.11	144.35	275,000	329,000	2,279	
										10.00	10.00	99.72	.....	.....	3,299	
80	1	0	2	1	.....	148	12	147.53	12.04	11.94	12.12	144.71	305,000	342,400	2,366	
										10.00	10.00	99.72	.....	.....	3,434	
81	1	0	2	1	.....	149	12	148.40	12.10	12.12	11.89	144.11	274,000	342,000	2,373	
										10.00	10.00	99.72	.....	.....	3,430	
E 61	1	2	4	1	.....	148	8	145.70	12.17	12.09	11.97	144.72	286,000	288,500	1,993	
										10.00	10.00	99.72	.....	.....	2,893	
62	1	2	4	1	.....	149	0	146.59	12.24	12.11	11.85	143.50	275,000	282,500	1,969	
										10.00	10.00	99.72	.....	.....	2,824	
63	1	2	4	1	.....	148	12	144.74	12.15	12.20	11.98	146.16	280,000	285,300	1,952	
										10.00	10.00	99.72	.....	.....	2,861	
E 91	1	2	4	3	.....	144	8	148.06	11.81	11.98	11.92	142.80	244,000	273,000	1,912	
										10.00	10.00	99.72	.....	.....	2,738	
95	1	2	4	3	.....	143	0	148.65	11.67	11.98	11.89	142.44	268,000	289,800	2,035	
										10.00	10.00	99.72	.....	.....	2,906	
98	1	2	4	3	.....	146	0	149.23	11.75	11.98	12.01	143.88	217,000	276,000	1,918	
										10.00	10.00	99.72	.....	.....	2,768	
E 96	1	2	4	6	.....	144	4	147.70	11.71	12.08	11.98	144.12	398,000	419,200	2,909	
										10.00	10.00	99.72	.....	.....	4,204	
97	1	2	4	6	.....	144	8	149.45	11.68	12.02	11.90	143.04	327,000	413,000	2,887	
										10.00	10.00	99.72	.....	.....	4,142	
99	1	2	4	6	.....	147	0	148.61	11.85	12.00	12.02	144.24	299,000	406,000	2,806	
										10.00	10.00	99.72	.....	.....	4,061	

Experiments with Concentrated Stresses.

Loads applied on an 8″ x 8″.25 plate on one surface of the concrete.



CONCRETE CUBES MADE OF ALPHA PORTLAND CEMENT.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional areas.	Ultimate strength.			Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surfaces.			First crack.	Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
C 68	1	0	2	1	.....	157	4	151.91	12.37	11.95	12.10	144.60	268,000	363,100	2,511	
										8.00	8.25	66.00	.....	.....	5,501	
84	1	0	2	1	.....	155	8	151.28	12.48	11.89	11.97	142.32	267,000	342,500	2,407	
										8.00	8.25	66.00	.....	.....	5,189	
88	1	0	2	1	.....	162	4	151.92	12.70	12.18	11.93	145.31	208,000	302,100	2,079	
										8.00	8.25	66.00	.....	.....	4,577	
C 45	1	2	4	1	.....	147	12	146.77	12.11	11.99	11.98	143.64	151,000	221,000	1,539	
										8.00	8.25	66.00	.....	.....	3,348	
52	1	2	4	1	.....	143	8	145.32	12.08	11.90	11.87	141.25	210,700	213,000	1,508	
										8.00	8.25	66.00	.....	.....	3,227	

CONCRETE CUBES MADE OF ALPHA PORTLAND CEMENT—Continued.

Marks.	Composition.			Age.		Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
	Cement.	Sand.	Broken stone.			Total.		Per cubic foot.	Height.	Compressed surfaces.				Total.	Per square inch.	
				Mos.	*Days.*	*Pounds.*	*Ounces.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
C 98	1	2	4	3	.....	150	0	148.63	12.08	12.05	11.98	144.36	269,000	281,400	1,949	
										8.00	8.25	66.00	.....	.....	4,264	
100	1	2	4	3	.....	151	8	149.25	12.09	12.03	12.06	145.08	315,000	317,800	2,190	
										8.00	8.25	66.00	.....	.....	4,815	
103	1	2	4	3	.....	148	12	151.54	11.94	11.76	12.08	142.06	273,000	298,000	2,098	
										8.00	8.25	66.00	.....	.....	4,515	
99	1	2	4	6	.....	151	0	150.50	12.03	12.06	11.95	144.12	358,000	391,000	2,713	
										8.00	8.25	66.00	.....	.....	5,924	
101	1	2	4	6	.....	152	8	150.74	12.07	12.10	11.97	144.84	319,000	363,000	2,510	
										8.00	8.25	66.00	.....	.....	5,508	
102	1	2	4	6	.....	152	8	151.38	12.10	11.92	12.07	143.87	332,000	368,000	2,558	
										8.00	8.25	66.00	.....	.....	5,576	

CONCRETE CUBES MADE OF GERMANIA PORTLAND CEMENT.

D 83	1	0	2	1	.....	151	12	149.79	12.28	11.95	11.98	142.56	271,000	300,200	2,106	
										8.00	8.25	66.00	.....	.....	4,548	
85	1	0	2	1	.....	141	0	.....	12.23	12.00	12.14	145.68	195,000	204,700	1,405	End surface deficient.
										8.00	8.25	66.00	.....	.....	3,101	
86	1	0	2	1	.....	149	0	149.88	12.04	11.89	12.00	142.68	298,000	352,000	2,467	
										8.00	8.25	66.00	.....	.....	5,333	
D 112	1	0	2	6	.....	149	0	150.51	11.86	12.03	11.99	144.24	372,000	450,500	3,123	
										8.00	8.25	66.00	.....	.....	6,826	
113	1	0	2	6	.....	151	4	148.66	11.97	12.01	12.23	146.88	342,000	430,100	2,928	
										8.00	8.25	66.00	.....	.....	6,517	
D 46	1	2	4	1	.....	158	4	150.18	12.54	12.10	12.00	145.20	219,000	237,800	1,638	
										8.00	8.25	66.00	.....	.....	3,608	
52	1	2	4	1	.....	158	12	148.70	12.47	11.99	11.95	143.28	220,000	233,000	1,626	
										8.00	8.25	66.00	.....	.....	3,530	
63	1	2	4	1	.....	158	0	147.79	12.29	12.15	11.98	145.56	219,000	239,400	1,645	
										8.00	8.25	66.00	.....	.....	3,627	

D 101	1	2	4	3	.....	147	0	149.49	11.96	12.03	11.81	142.07	218,000	227,000	1,598
										8.00	8.25	66.00	.....	.....	3,439
104	1	2	4	3	.....	145	4	147.35	11.82	12.10	11.91	144.11	216,000	236,500	1,641
										8.00	8.25	66.00	.....	.....	3,583
106	1	2	4	3	.....	147	4	148.36	11.92	12.03	11.96	143.88	234,000	234,000	1,626
										8.00	8.25	66.00	.....	.....	3,545
D 100	1	2	4	6	.....	146	8	148.11	12.08	11.90	11.89	141.49	276,000	286,400	2,024
										8.00	8.25	66.00	.....	.....	4,339
102	1	2	4	6	.....	149	8	149.10	11.82	12.37	11.85	146.58	297,000	318,500	2,178
										8.00	8.25	66.00	.....	.....	4,826
105	1	2	4	6	.....	158	8	150.62	12.12	11.90	12.21	145.30	298,000	302,400	2,061
										8.00	8.25	66.00	.....	.....	4,582

CONCRETE CUBES MADE OF ALSEN'S PORTLAND CEMENT.

E 76	1	0	2	1	.....	150	4	149.16	12.17	11.87	12.05	143.03	218,000	303,800	2,124
										8.00	8.25	66.00	.....	.....	4,603
77	1	0	2	1	.....	151	0	147.56	12.27	11.93	12.08	144.11	209,000	249,800	1,733
										8.00	8.25	66.00	.....	.....	3,785
78	1	0	2	1	.....	151	8	148.15	12.12	12.10	12.05	145.80	213,000	255,600	1,753
										8.00	8.25	66.00	.....	.....	3,872
E 110	1	0	2	6	.....	147	0	147.27	11.90	11.90	12.18	144.94	356,000	439,000	3,028
										8.00	8.25	66.00	.....	.....	6,651
111	1	0	2	6	.....	148	8	147.28	11.96	12.12	12.02	145.68	334,000	403,500	2,770
										8.00	8.25	66.00	.....	.....	6,114
E 64	1	2	4	1	.....	151	4	147.84	12.20	11.85	12.27	145.40	219,000	223,100	1,534
										8.00	8.25	66.00	.....	.....	3,380
66	1	2	4	1	.....	149	0	147.77	12.12	12.03	11.95	143.76	210,000	216,200	1,504
										8.00	8.25	66.00	.....	.....	3,276
68	1	2	4	1	.....	146	8	145.54	12.13	11.95	12.00	143.40	198,000	200,900	1,401
										8.00	8.25	66.00	.....	.....	3,044
E 101	1	2	4	3	.....	146	8	149.99	11.74	11.98	12.00	143.76	162,000	223,000	1,551
										8.00	8.25	66.00	.....	.....	3,379
102	1	2	4	3	.....	143	4	149.07	11.57	11.95	12.01	143.52	172,000	213,000	1,484
										8.00	8.25	66.00	.....	.....	3,227
108	1	2	4	3	.....	145	0	148.78	11.56	12.03	12.11	145.68	181,000	242,400	1,664
										8.00	8.25	66.00	.....	.....	3,673
E 100	1	2	4	6	.....	148	0	148.74	11.94	11.96	12.04	144.00	260,000	284,000	1,972
										8.00	8.25	66.00	.....	.....	4,308
104	1	2	4	6	.....	145	8	147.91	11.62	12.14	12.05	146.29	296,000	362,100	2,475
										8.00	8.25	66.00	.....	.....	5,486
105	1	2	4	6	.....	146	0	148.79	11.63	12.04	12.11	145.80	310,000	340,600	2,336
										8.00	8.25	66.00	.....	.....	5,161

CONCRETE TESTS.

MEAN COMPRESSIVE STRENGTH.

12-INCH CUBES.

Brand of cement.	Composition.			Mean compressive strength per square inch at age of—			
	Cement.	Sand.	Broken stone.	7 days.	1 month.	3 months.	6 months.
				Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Saylor's Portland	1	2	4	1,724	2,238	2,702	3,510
	1	3	6	1,625	2,568	2,882	3,567
	1	6	12	675	800	1,128	1,542
Atlas Portland	1	2	4	1,897	2,428	2,986	3,953
	1	3	6	1,050	1,816	2,538	3,170
	1	6	12	594	1,090	1,201	1,563
Alpha Portland	1	0	2	3,294	5,058	5,047	.....
	1	2	4	904	2,420	3,123	4,411
	1	3	6	892	2,150	2,355	2,750
	1	6	12	564	1,218	1,257	1,582
Germania Portland	1	0	2	2,734	3,246	3,858	5,129
	1	2	4	2,219	2,642	3,082	3,643
	1	3	6	1,550	2,174	2,486	2,930
	1	6	12	759	967	963	815
Alsen's Portland	1	0	2	3,118	3,240	3,710	5,332
	1	2	4	1,592	2,299	2,606	3,612
	1	3	6	1,438	2,114	2,349	3,026
	1	6	12	417	873	844	1,323

10-INCH CUBES.

Alpha Portland	1	0	2	.....	.....	5,463	6,556

CONCRETE TESTS.

MEAN COMPRESSIVE STRENGTH.

12-INCH CUBES WITH CONCENTRATED STRESS ON A 10″ × 10″ PLATE ON ONE SURFACE.

Brand of cement.	Composition.			Load per square inch on concentrated surface.		
	Cement.	Sand.	Broken stone.	Age, 1 month.	Age, 3 months.	Age, 6 months.
				Pounds.	*Pounds.*	*Pounds.*
Alpha Portland	1	0	2	4,967	.....	.....
	1	2	4	2,860	3,953	5,101
Germania Portland	1	0	2	4,282	.....	.....
	1	2	4	3,249	2,973	3,754
Alsen's Portland	1	0	2	3,388	.....	.....
	1	2	4	2,859	2,804	4,136

12-INCH CUBES WITH CONCENTRATED STRESS ON A PLATE 8″ × 8″.25 ON ONE SURFACE.

Alpha Portland	1	0	2	5,089	.....	.....
	1	2	4	3,287	4,581	5,869
Germania Portland	1	0	2	4,327	.....	6,671
	1	2	4	3,567	3,522	4,582
Alsen's Portland	1	0	2	4,067	.....	6,382
	1	2	4	3,233	3,426	4,983

Size of specimens, 12-inch cubes.
Gauged length, 5″.

Marks.	Brand of cement.	Composition.			Age.		Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.	Broken stone.			100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Mos.	*Days.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
A 58	Saylor's Portland	1	2	4	.....	9	1,667,000	1,667,000	.....	.0025	.0063	.....	1,944
61	do	1	2	4	1	.....	2,500,000	2,500,000	.....	.0001	.0012	.....	2,119
65	do	1	2	4	3	.....	3,571,000	3,461,000	1,667,000	.0002	.0005	.0040	2,778
60	do	1	2	4	6	.....	5,000,000	4,500,000	2,631,000	.0002	.0004	.0011	3,959
A 22	do	1	3	6	.....	9	2,273,000	1,956,000	.....	.0006	.0021	.....	2,308
15	do	1	3	6	1	.....	2,778,000	3,214,000	2,083,000	0008	.0007	.0024	2,600
17	do	1	3	6	3	.....	4,167,000	3,750,000	2,778,000	0.	0.	.0009	2,805
14	do	1	3	6	6	.....	2,500,000	2,812,000	2,000,000	.0001	.0005	.0022	3,743
A 44	do	1	6	12	.....	9	.....	.....	.....	.0120	.....	.....	795
37	do	1	6	12	1	.....	833,000	.....	.....	.0095	.....	.....	880
32	do	1	6	12	3	.....	2,273,000	1,875,000	.....	.0011	.0026	.....	1,210
35	do	1	6	12	6	.....	2,083,000	1,731,000	.....	.0002	.0022	.....	1,471
B 49	Atlas Portland	1	2	4	.....	8	2,778,000	1,875,000	.....	.0006	.0031	.....	1,695
60	do	1	2	4	1	.....	3,125,000	2,812,000	1,724,000	.0001	.0004	.0040	2,373
66	do	1	2	4	3	.....	4,167,000	3,214,000	2,083,000	.0001	.0002	.0010	2,918
62	do	1	2	4	6	.....	3,125,000	3,214,000	2,273,000	.0001	.0004	.0013	4,000
B 15	Atlas Portland	1	3	6	.....	8	1,667,000	.....	.....	.0039	.....	.....	1,283
14	do	1	3	6	1	.....	3,125,000	2,647,000	.....	.0001	.0008	.....	2,097
9	do	1	3	6	3	.....	2,778,000	2,500,000	1,471,000	.0002	.0007	.0048	2,800
10	do	1	3	6	6	.....	3,571,000	3,461,000	2,174,000	.0001	.0003	.0027	3,256
B 40	do	1	6	12	.....	8	.....	.....	.....	.0156	.....	.....	642
34	do	1	6	12	1	.....	1,316,000	.....	.....	.0023	.....	.....	1,100
36	do	1	6	12	3	.....	1,136,000	833,000	.....	.0039	.0135	.....	1,324
28	do	1	6	12	6	.....	1,786,000	1,607,000	.....	.0008	.0030	.....	1,795
C 73	Alpha Portland	1	0	2	.....	7	2,273,000	2,143,000	1,613,000	.0008	.0010	.0043	3,211
88	do	1	0	2	1	.....	3,125,000	3,000,000	2,941,000	.0001	.0003	.0010	4,766
87	do	1	0	2	3	.....	5,000,000	4,500,000	2,941,000	.0001	.0004	.0008	4,841

THE ELASTIC PROPERTIES OF CONCRETE—Continued.

Marks	Brand of cement.	Composition			Age.		Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.	Broken stone.			100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Mos.	*Days.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
C 57	Alpha Portland	1	2	4	.....	7	1,000,000	.....	.....	.0137	.....	.....	962
66	....do	1	2	4	1	.....	2,083,000	1,875,000	1,190,000	.0006	.0016	.0088	2,590
62	....do	1	2	4	3	.....	4,167,000	3,750,000	2,778,000	.0001	.0002	.0011	3,226
90	....do	1	2	4	6	.....	3,125,000	3,214,000	3,571,000	.0001	.0003	.0009	4,847
C 22	....do	1	3	6	1	.....	2,083,000	2,143,000	.....	.0006	.0016	.....	2,364
21	....do	1	3	6	3	.....	3,571,000	2,812,000	2,000,000	.0001	.0002	.0016	2,880
3	....do	1	3	6	6	.....	4,167,000	4,091,000	1,724,000	.0001	.0004	.0022	2,627
C 31	....do	1	6	12	1	.....	1,667,000	1,607,000	.....	.0017	.0030	.....	1,452
42	....do	1	6	12	3	.....	1,786,000	1,800,000	.....	.0012	.0036	.....	1,677
43	....do	1	6	12	6	.....	1,923,000	1,667,000	.....	.0007	.0020	.....	2,055
D 76	Germania Portland	1	0	2	.....	7	2,083,000	1,607,000	1,087,000	.0004	.0012	.0086	2,638
67	....do	1	0	2	1	.....	3,571,000	3,214,000	2,778,000	0.	.0003	.0011	3,600
82	....do	1	0	2	3	.....	2,778,000	2,500,000	1,724,000	.0003	.0007	.0024	3,800
111	....do	1	0	2	6	.....	3,571,000	3,461,000	2,381,000	.0002	.0004	.0009	4,978
D 59	....do	1	2	4	.....	7	2,500,000	2,143,000	1,351,000	.0003	.0012	.0072	2,400
64	....do	1	2	4	1	.....	.....	.....	.....	0.	.....	.0020	2,983
53	....do	1	2	4	3	.....	3,571,000	3,214,000	2,381,000	0.	.0001	.0018	3,157
96	....do	1	2	4	6	.....	4,167,000	3,750,000	1,852,000	.0002	.0004	.0020	3,309
D 11	....do	1	3	6	.....	7	2,273,000	1,607,000	.....	.0009	.0049	.....	1,386
19	....do	1	3	6	1	.....	2,273,000	1,875,000	1,219,000	.0005	.0015	.0101	2,431
17	....do	1	3	6	3	.....	2,778,000	2,812,000	2,083,000	.0002	.0008	.0037	2,651
8	....do	1	3	6	6	.....	3,125,000	3,000,000	1,852,000	.0001	.0005	.0028	3,207
D 35	....do	1	6	12	.....	7	.....	.....	.....	.0175	.....	.....	754
31	....do	1	6	12	1	.....	961,000	.....	.....	.0082	.0134	.....	1,068
25	....do	1	6	12	3	.....	2,083,000	1,667,000	.....	.0011	.0028	.....	1,276
40	....do	1	6	12	6	.....	1,786,000	1,364,000	.....	.0024	.0039	.....	1 097
E 73	Alsen's Portland	1	0	2	.....	10	2,500,000	2,368,000	1,515,000	.0002	.0007	.0038	3,279
88	....do	1	0	2	1	.....	2,273,000	1,956,000	1,429,000	.0002	.0009	.0035	3,420
85	....do	1	0	2	3	.....	2,273,000	2,250,000	1,515,000	.0003	.0008	.0020	3,144
112	....do	1	0	2	6	.....	3,571,000	3,214,000	2,273,000	.0003	.0006	.0012	5,360

E 49	.....do.....	1	2	4	.....	10	2,500,000	2,143,000	.....	.0004	.0017	.....	1,862
67	.....do.....	1	2	4	1	.....	2,778,000	2,647,000	1,471,000	.0002	.0007	.0054	2,373
56	.....do.....	1	2	4	3	.....	2,778,000	2,500,000	1,389,000	.0003	.0006	.0039	2,600
94	.....do.....	1	2	4	6	.....	4,167,000	4,091,000	2,631,000	.0003	.0005	.0013	3,800
E 5	.....do.....	1	3	6	.....	10	1,667,000	1,452,000	.....	.0007	.0045	.....	1,763
19	.....do.....	1	3	6	1	.....	2,273,000	1,875,000	.....	.0004	.0017	.....	2,146
15	.....do.....	1	3	6	3	.....	2,778,000	2,500,000	1,667,000	.0002	.0007	.0037	2,633
22	.....do.....	1	3	6	6	.....	3,571,000	3,461,000	1,724,000	.0001	.0004	.0025	3,183
E 26	.....do.....	1	6	12	.....	10	.....	.....	.....	.....	.....	.....	568
36	.....do.....	1	6	12	1	.....	1,562,000	.....	.....	.0037	.....	.....	944
41	.....do.....	1	6	12	3	.....	1,562,000	1,154,000	.....	.0024	.0077	.....	1,158
43	.....do.....	1	6	12	6	.....	1,786,000	1,452,000	.....	.0014	.0043	.....	1,420
C 3	Alpha Portland[1]	1	0	2	6	.....	5,000,000	4,091,000	3,846,000	.0001	.0001	.0006	7,113

[1] 10-inch cube.

Marks, A–58.
Composition: Saylor's Portland cement, 1; sand, 2; broken stone, 4.
Age, 9 days.
Weight per cubic foot, 148.89 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0005	.0002	
43,200	300	.0012	.0007	
57,600	400	.0021	.0013	
72,000	500	.0030	.0019	
86,400	600	.0040	.0025	E=1,667,000 pounds per square inch.
100,800	700	.0050	.0034	
115,200	800	.0062	.0042	
129,600	900	.0077	.0053	
144,000	1,000	.0090	.0063	E=1,667,000 pounds per square inch.
172,800	1,200	.0122	.0087	First crack.
201,600	1,400	.0154	.0112	
230,400	1,600	.0204	.0151	
259,200	1,800	.0255	.0195	
279,900	1,944	.....	.....	Ultimate strength.

Marks, A–61.
Composition: Saylor's Portland cement, 1; sand, 2; broken stone, 4.
Age, 1 month.
Weight per cubic foot, 150.82 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0002	0.	
57,792	400	.0004	.0001	
72,240	500	.0007	.0001	
86,688	600	.0011	.0001	E=2,500,000 pounds per square inch.
101,136	700	.0013	.0002	
115,584	800	.0018	.0005	
130,032	900	.0023	.0008	
144,480	1,000	.0030	.0012	E=2,500,000 pounds per square inch.
173,376	1,200	.0050	.0025	
202,272	1,400	.0075	.0042	
231,168	1,600	.0109	.0066	
260,064	1,800	.0172	.0115	First crack.
288,960	2,000	.0272	.0197	
306,100	2,119	.....	.....	Ultimate strength.

Marks, A–65.
Composition: Saylor's Portland cement, 1; sand, 2; broken stone, 4.
Age, 3 months.
Weight per cubic foot, 152.40 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0004	.0001	
57,888	400	.0006	.0001	
72,360	500	.0007	.0001	
86,832	600	.0009	.0002	E=3,571,000 pounds per square inch.
101,304	700	.0011	.0002	
115,776	800	.0013	.0003	
130,248	900	.0015	.0004	
144,720	1,000	.0018	.0005	E=3,461,000 pounds per square inch.
173,664	1,200	.0024	.0007	
202,608	1,400	.0034	.0011	
231,552	1,600	.0046	.0018	E=1,667,000 pounds per square inch.
260,496	1,800	.0060	.0025	
289,440	2,000	.0083	.0040	
308,000	.....	.....	.....	First crack.
318,384	2,200	.0110	.0057	
347,328	2,400	.0142	.0082	
376,272	2,600	.0183	.0114	
402,000	2,778	.....	.....	Ultimate strength.

Marks, A–60.
Composition: Saylor's Portland cement, 1; sand, 2; broken stone, 4.
Age, 6 months.
Weight per cubic foot, 150.72 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0003	0.	
57,792	400	.0004	.0001	
72,240	500	.0006	.0001	
86,688	600	.0007	.0002	E=5,000,000 pounds per square inch.
101,136	700	.0009	.0002	
115,584	800	.0011	.0003	
130,032	900	.0012	.0003	
144,480	1,000	.0014	.0004	E=4,500,000 pounds per square inch.
173,376	1,200	.0019	.0005	
202,272	1,400	.0022	.0006	
231,168	1,600	.0029	.0008	E=2,631,000 pounds per square inch.
260,064	1,800	.0034	.0010	
288,960	2,000	.0040	.0011	
317,856	2,200	.0047	.0014	
346,752	2,400	.0056	.0019	
375,648	2,600	.0066	.0022	
404,544	2,800	.0079	.0029	
433,440	3,000	.0092	.0035	
462,336	3,200	.0108	.0044	
491,232	3,400	.0125	.0052	
520,128	3,600	.0158	.0076	First crack.
549,024	3,800	.0192	.0096	
572,000	3,959	.....	.....	Ultimate strength.

Marks, A–22.
Composition: Saylor's Portland cement, 1; sand, 3; broken stone, 6.
Age, 9 days.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0002	0.	
43,596	300	.0004	.0001	
58,128	400	.0008	.0002	
72,660	500	.0012	.0003	
87,192	600	.0017	.0006	E=2,278,000 pounds per square inch.
101,724	700	.0022	.0008	
116,256	800	.0027	.0012	
130,788	900	.0035	.0016	
145,320	1,000	.0044	.0021	E=1,956,000 pounds per square inch.
174,384	1,200	.0060	.0032	
203,448	1,400	.0077	.0042	
232,512	1,600	.0096	.0054	First crack.
261,576	1,800	.0121	.0068	
290,640	2,000	.0150	.0089	
319,704	2,200	.0187	.0114	
335,400	2,308	.....	.....	Ultimate strength.

Marks, A–15.
Composition: Saylor's Portland cement, 1; sand, 3; broken stone, 6.
Age, 1 month.
Weight per cubic foot, 149.26 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0002	0.	
43,236	300	.0004	.0001	
57,648	400	.0007	.0002	
72,060	500	.0009	.0003	
86,472	600	.0012	.0003	E=2,778,000 pounds per square inch.
100,884	700	.0014	.0005	
115,296	800	.0016	.0006	
129,708	900	.0018	.0007	
144,120	1,000	.0021	.0007	E=3,214,000 pounds per square inch.
172,944	1,200	.0027	.0009	
201,768	1,400	.0032	.0011	
230,592	1,600	.0040	.0014	E=2,083,000 pounds per square inch.
259,416	1,800	.0050	.0019	
288,240	2,000	.0062	.0024	
317,064	2,200	.0077	.0034	First crack.
345,888	2,400	.0097	.0044	
374,712	2,600	.0118	.0055	Ultimate strength.

Marks, A–17.
Composition: Saylor's Portland cement, 1; sand, 3; broken stone, 6.
Age, 3 months.
Weight per cubic foot, 151.84 pounds.
Sectional area, 146.89 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,689	100	0.	0.	Initial load.
29,378	200	.0001	0.	
44,067	300	.0002	0.	
58,756	400	.0003	0.	
73,445	500	.0004	0.	
88,134	600	.0006	0.	E = 4,167,000 pounds per square inch.
102,823	700	.0008	0.	
117,512	800	.0009	0.	
132,201	900	.0010	0.	
146,890	1,000	.0012	0.	E = 3,750,000 pounds per square inch.
176,268	1,200	.0015	.0001	
205,646	1,400	.0020	.0002	
235,024	1,600	.0027	.0005	E = 2,778,000 pounds per square inch.
264,402	1,800	.0032	.0007	
293,780	2,000	.0039	.0009	
323,158	2,200	.0046	.0013	First crack.
352,536	2,400	.0055	.0017	
381,914	2,600	.0067	.0023	
411,292	2,800	.0087	.0034	
412,000	2,805	.....	.....	Ultimate strength.

Marks, A–14.
Composition: Saylor's Portland cement, 1; sand, 3; broken stone, 6.
Age, 6 months.
Weight per cubic foot, 150.24 pounds.
Sectional area, 145.19 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,519	100	0.	0.	Initial load.
29,038	200	.0001	0.	
43,557	300	.0003	0.	
58,076	400	.0005	0.	
72,595	500	.0008	0.	
87,114	600	.0011	.0001	E=2,500,000 pounds per square inch.
101,633	700	.0013	.0002	
116,152	800	.0015	.0002	
130,671	900	.0018	.0003	
145,190	1,000	.0021	.0005	E=2,812,000 pounds per square inch.
174,228	1,200	.0028	.0007	
203,266	1,400	.0036	.0010	
232,304	1,600	.0044	.0014	E=2,000,000 pounds per square inch.
261,342	1,800	.0053	.0017	
290,380	2,000	.0063	.0022	
319,418	2,200	.0076	.0027	
348,456	2,400	.0087	.0033	
377,494	2,600	.0103	.0043	
406,532	2,800	.0118	.0053	First crack.
435,570	3,000	.0137	.0064	
464,608	2,200	.0161	.0080	
493,646	3,400	.0197	.0103	
522,684	3,600	.0246	.....	
543,500	3,743	.....	.....	Ultimate strength.

Marks, A–44.
Composition: Saylor's Portland cement, 1; sand, 6; broken stone, 12.
Age, 9 days.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load
28,824	200	.0016	.0012	
43,236	300	.0036	.0029	
57,648	400	.0065	.0051	
72,060	500	.0100	.0080	First crack.
86,472	600	.0149	.0120	
100,884	700	.0211	.0170	
114,600	795	.....	.....	Ultimate strength.

Marks, A–37.
Composition: Saylor's Portland cement, 1; sand, 6; broken stone, 12.
Age, 1 month.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0007	.0001	
43,452	300	.0020	.0012	
57,936	400	.0044	.0031	
72,420	500	.0077	.0057	
86,904	600	.0125	.0095	E=833,000 pounds per square inch.
101,388	700	.0182	.0140	
115,872	800	.0275	.0222	
127,500	880	.....	.....	Ultimate strength.

Marks, A–32.
Composition: Saylor's Portland cement, 1; sand, 6; broken stone, 12.
Age, 3 months.
Sectional area, 145.42 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,542	100	0.	0.	Initial load.
29,084	200	.0008	.0001	
43,626	300	.0007	.0002	
58,168	400	.0012	.0005	
72,710	500	.0016	.0007	
87,252	600	.0022	.0011	E = 2,273,000 pounds per square inch.
101,794	700	.0030	.0015	
116,336	800	.0036	.0020	
130,878	900	.0043	.0023	
145,420	1,000	.0050	.0026	E = 1,875,000 pounds per square inch.
160,000	.....	.....	.....	First crack.
174,504	1,200	.0071	.0038	
176,000	1,210	.....	.....	Ultimate strength.

Marks, A–35.
Composition: Saylor's Portland cement, 1; sand, 6; broken stone, 12.
Age, 6 months.
Sectional area, 145.64 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,564	100	0.	0.	Initial load.
29,128	200	.0001	0.	
43,692	300	.0008	0.	
58,256	400	.0007	.0001	
72,820	500	.0011	.0002	
87,384	600	.0014	.0002	E=2,063,000 pounds per square inch.
101,948	700	.0020	.0005	
116,512	800	.0027	.0009	
131,076	900	.0040	.0016	
145,640	1,000	.0048	.0022	E=1,751,000 pounds per square inch.
174,768	1,200	.0075	.0040	
208,000	.....	.....	.....	First crack.
214,200	1,471	.....	.....	Ultimate strength.

Marks, B–49.
Composition: Atlas Portland cement, 1; sand, 2; broken stone, 4.
Age, 8 days.
Weight per cubic foot, 151.01 pounds.
Sectional area, 143.04 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,304	100	0.	0.	Initial load.
28,608	200	.0001	0.	
42,912	300	.0004	.0001	
57,216	400	.0007	.0001	
71,520	500	.0011	.0003	
85,824	600	.0015	.0006	E=2,778,000 pounds per square inch.
100,128	700	.0022	.0009	
114,432	800	.0030	.0013	
128,736	900	.0041	.0020	
143,040	1,000	.0055	.0031	E=1,875,000 pounds per square inch.
171,648	1,200	.0095	.0061	
200,256	1,400	.0154	.0110	
228,864	1,600	.0260	.0201	
242,400	1,695	.....	.....	Ultimate strength.

Marks, B–60.
Composition: Atlas Portland cement, 1; sand, 2; broken stone, 4.
Age, 1 month.
Weight per cubic foot, 151.11 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0001	0.	
43,560	300	.0003	0.	
58,080	400	.0005	0.	
72,600	500	.0007	0.	
87,120	600	.0009	.0001	E=3,125,000 pounds per square inch.
101,640	700	.0011	.0002	
116,160	800	.0014	.0003	
130,680	900	.0017	.0004	
145,200	1,000	.0020	.0004	E=2,812,000 pounds per square inch.
174,240	1,200	.0026	.0007	
203,280	1,400	.0036	.0011	
232,320	1,600	.0047	.0018	E=1,724,000 pounds per square inch.
261,360	1,800	.0064	.0027	
290,400	2,000	.0085	.0040	
319,440	2,200	.0123	.0069	First crack.
344,500	2,373	.....	.....	Ultimate strength.

Marks, B–66.
Composition: Atlas Portland cement, 1; sand, 2; broken stone, 4.
Age, 3 months.
Weight per cubic foot, 150.16 pounds.
Sectional area, 146.62 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,662	100	0.	0.	Initial load.
29,324	200	.0001	0.	
43,986	300	.0002	0.	
58,648	400	.0003	0.	
73,310	500	.0006	0.	
87,972	600	.0007	.0001	E=4,167,000 pounds per square inch.
102,634	700	.0010	.0001	
117,296	800	.0012	.0001	
131,958	900	.0014	.0002	
146,620	1,000	.0016	.0002	E=3,214,000 pounds per square inch.
175,944	1,200	.0021	.0004	
205,268	1,400	.0027	.0006	
234,592	1,600	.0035	.0009	E=2,083,000 pounds per square inch.
263,916	1,800	.0042	.0010	
293,240	2,000	.0048	.0010	
322,564	2,200	.0059	.0014	
351,888	2,400	.0081	.0030	
381,212	2,600	.0118	.0055	
410,536	2,800	.0199	.0115	First crack.
428,000	2,918	.....	.....	Ultimate strength.

Marks, B–62.
Composition: Atlas Portland cement, 1; sand, 2; broken stone, 4.
Age, 6 months.
Weight per cubic foot, 150.06 pounds.
Sectional area, 147.13 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,713	100	0.	0.	Initial load.
29,426	200	.0001	0.	
44,139	300	.0003	0.	
58,852	400	.0005	0.	
73,565	500	.0007	.0001	
88,278	600	.0009	.0001	E = 3,125,000 pounds per square inch.
102,991	700	.0011	.0001	
117,704	800	.0013	.0002	
132,417	900	.0015	.0003	
147,130	1,000	.0018	.0004	E = 3,214,000 pounds per square inch.
176,556	1,200	.0023	.0005	
205,982	1,400	.0029	.0007	
235,408	1,600	.0035	.0009	E = 2,273,000 pounds per square inch.
264,834	1,800	.0041	.0010	
294,260	2,000	.0049	.0013	
323,686	2,200	.0057	.0017	
353,112	2,400	.0066	.0022	
382,538	2,600	.0077	.0027	
411,964	2,800	.0087	.0032	
441,390	3,000	.0100	.0039	
470,816	3,200	.0112	.0044	
500,242	3,400	.0129	.0058	
529,668	3,600	.0150	.0067	
550,000	.....	.....	.....	First crack.
559,094	3,800	.0173	.0082	
588,520	4,000	.0205	.0111	Ultimate strength.

After releasing the maximum load and determining the set under the initial load, the stress was increased to about 1,600 pounds per square inch, which was sustained for a period of 1 hour. At the end of this time the load was increased, failure occurring under a load of about 3,600 pounds per square inch.

Marks, B–15.
Composition: Atlas Portland cement, 1; sand, 3; broken stone, 6.
Age, 8 days.
Weight per cubic foot, 150.89 pounds.
Sectional area 142.68 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,268	100	0.	0.	Initial load.
28,536	200	.0004	.0002	
42,804	300	.0010	.0005	
57,072	400	.0021	.0013	
71,340	500	.0035	.0024	
85,608	600	.0054	.0039	E=1,667,000 pounds per square inch.
99,876	700	.0078	.0058	
114,144	800	.0107	.0083	
128,412	900	.0130	.0102	
142,680	1000	.0178	.0143	First crack.
183,100	1283	.....	.....	Ultimate strength.

Marks, B–14.
Composition: Atlas Portland cement, 1; sand, 3; broken stone, 6.
Age, 1 month.
Weight per cubic foot, 151.18 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0002	0.	
57,792	400	.0004	.0001	
72,240	500	.0006	.0001	
86,688	600	.0009	.0001	E=3,125,000 pounds per square inch.
101,136	700	.0012	.0002	
115,584	800	.0015	.0003	
130,032	900	.0020	.0005	
144,480	1,000	.0025	.0008	E=2,647,000 pounds per square inch.
173,376	1,200	.0042	.0018	
202,272	1,400	.0064	.0031	
231,168	1,600	.0097	.0055	
260,064	1,800	.0135	.0083	First crack.
288,960	2,000	.0202	.0133	
303,000	2,097	.....	.....	Ultimate strength.

Marks, B–9.
Composition: Atlas Portland cement, 1; sand, 3; broken stone, 6.
Age, 3 months.
Weight per cubic foot, 152.15 pounds.
Sectional area, 145.55 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,555	100	0.	0.	Initial load.
29,110	200	.0001	0.	
43,665	300	.0004	0.	
58,220	400	.0006	.0001	
72,775	500	.0009	.0001	
87,330	600	.0011	.0002	E=2,778,000 pounds per square inch.
101,885	700	.0014	.0004	
116,440	800	.0017	.0005	
130,995	900	.0021	.0006	
145,550	1,000	.0025	.0007	E=2,500,000 pounds per square inch.
174,660	1,200	.0033	.0011	
203,770	1,400	.0044	.0016	
232,880	1,600	.0060	.0026	E=1,471,000 pounds per square inch.
261,990	1,800	.0080	.0036	
291,100	2,000	.0100	.0048	
320,210	2,200	.0122	.0064	
349,320	2,400	.0157	.0088	
370,000	.....	.....	.....	First crack.
378,430	2,600	.0196	.0116	
407,540	2,800	.0269	.0167	Ultimate strength.

Marks, B–10.
Composition: Atlas Portland cement, 1; sand, 3; broken stone, 6.
Age, 6 months.
Weight per cubic foot, 151.34 pounds.
Sectional area, 146.15 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,615	100	0.	0.	Initial load.
29,230	200	.0001	0.	
43,845	300	.0003	.0001	
58,460	400	.0004	.0001	
73,075	500	.0006	.0001	
87,690	600	.0008	.0001	E=3,571,000 pounds per square inch.
102,305	700	.0010	.0002	
116,920	800	.0012	.0002	
131,535	900	.0014	.0003	
146,150	1,000	.0016	.0003	E=3,461,000 pounds per square inch.
175,380	1,200	.0021	.0005	
204,610	1,400	.0029	.0008	
233,840	1,600	.0040	.0014	E=2,174,000 pounds per square inch.
263,070	1,800	.0049	.0018	
292,300	2,000	.0063	.0027	
321,530	2,200	.0082	.0038	
350,760	2,400	.0104	.0051	
379,990	2,600	.0129	.0068	
405,000	.....	.....	.....	First crack.
409,220	2,800	.0170	.0097	
438,450	3,000	.0222	.0134	
475,800	3,256	.....	.....	Ultimate strength.

Marks, B–40.
Composition: Atlas Portland cement, 1; sand, 6; broken stone, 12.
Age, 8 days.
Sectional area, 146.52 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,652	100	0.	0.	Initial load.
29,304	200	.0029	.0023	
43,956	300	.0069	.0056	
57,000	.....	.....	.....	First crack.
58,608	400	.0110	.0091	
73,260	500	.0150	.0125	
87,912	600	.0196	.0156	
94,100	642	.....	.....	Ultimate strength.

Marks, B–34.
Composition: Atlas Portland cement, 1; sand, 6; broken stone, 12.
Age, 1 month.
Sectional area, 146.04 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,604	100	0.	0.	Initial load.
29,208	200	.0004	0.	
43,812	300	.0010	.0002	
58,416	400	.0017	.0008	
73,020	500	.0028	.0014	
87,624	600	.0042	.0023	E=1,316,000 pounds per square inch.
102,228	700	.0060	.0035	
116,832	800	.0085	.0052	
131,436	900	.0110	.0071	
146,040	1,000	.0142	.0098	First crack.
160,644	1,100	.....	.....	Ultimate strength.

Marks, B–36.
Composition: Atlas Portland cement, 1; sand, 6; broken stone, 12.
Age, 3 months.
Sectional area, 146.04 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,604	100	0.	0.	Initial load.
29,208	200	.0008	.0004	
43,812	300	.0017	.0010	
58,416	400	.0029	.0016	
73,020	500	.0043	.0026	
87,624	600	.0061	.0039	E=1,136,000 pounds per square inch.
102,228	700	.0085	.0055	
116,832	800	.0115	.0077	
131,436	900	.0147	.0102	
146,040	1,000	.0189	.0135	E=833,000 pounds per square inch.
160,644	1,100	.0251	.0187	First crack.
193,400	1,324	.....	.....	Ultimate strength.

Marks, B–28.
Composition: Atlas Portland cement, 1; sand, 6; broken stone, 12.
Age, 6 months.
Sectional area, 145.79 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,579	100	0.	0.	Initial load.
29,158	200	.0001	0.	
43,737	300	.0006	0.	
58,316	400	.0011	.0003	
72,895	500	.0016	.0005	
87,474	600	.0022	.0008	E=1,786,000 pounds per square inch.
102,053	700	.0029	.0011	
116,632	800	.0037	.0016	
131,211	900	.0046	.0022	
145,790	1,000	.0058	.0030	E=1,607,000 pounds per square inch.
174,948	1,200	.0085	.0048	
204,106	1,400	.0119	.0075	
233,264	1,600	.0166	.0109	
252,000	.....	.....	.....	First crack.
261,756	1,795	.0229	.0162	Ultimate strength.

Marks, C–73.
Composition: Alpha Portland cement, 1; sand, 0; broken stone, 2.
Age, 7 days.
Weight per cubic foot, 152.83 pounds.
Sectional area, 144.82 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,482	100	0.	0.	Initial load.
28,964	200	.0002	0.	
43,446	300	.0005	.0001	
57,928	400	.0009	.0002	
72,410	500	.0012	.0002	
86,892	600	.0014	.0008	E = 2,273,000 pounds per square inch.
101,374	700	.0019	.0006	
115,856	800	.0023	.0007	
130,338	900	.0027	.0008	
144,820	1,000	.0031	.0010	E = 2,143,000 pounds per square inch.
173,784	1,200	.0041	.0013	
202,748	1,400	.0052	.0021	
231,712	1,600	.0067	.0028	E = 1,613,000 pounds per square inch.
260,676	1,800	.0081	.0036	
289,640	2,000	.0096	.0043	
318,604	2,200	.0109	.0049	
347,568	2,400	.0126	.0059	First crack.
376,532	2,600	.0144	.0068	
405,496	2,800	.0166	.0080	
434,460	3,000	.0200	.0100	
463,424	3,200	.0870	.....	
465,000	3,211	.....	.....	Ultimate strength.

Marks, C–83.
Composition: Alpha Portland cement, 1; sand, 0; broken stone, 2.
Age, 1 month.
Weight per cubic foot, 152.31 pounds.
Sectional area, 143.40 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,340	100	0.	0.	Initial load.
28,680	200	.0001	0.	
43,020	300	.0003	0.	
57,260	400	.0005	0.	
71,700	500	.0007	0.	
86,040	600	.0009	.0001	E=3,125,000 pounds per square inch.
100,380	700	.0011	.0001	
114,720	800	.0013	.0002	
129,060	900	.0016	.0003	
143,400	1,000	.0018	.0003	E=3,000,000 pounds per square inch.
172,080	1,200	.0023	.0005	
200,760	1,400	.0028	.0006	
229,440	1,600	.0034	.0008	E=2,941,000 pounds per square inch.
258,120	1,800	.0038	.0009	
286,800	2,000	.0042	.0010	
315,480	2,200	.0047	.0011	
344,160	2,400	.0051	.0012	
372,840	2,600	.0057	.0013	
401,520	2,800	.0063	.0016	
430,200	3,000	.0070	.0017	
458,880	3,200	.0077	.0021	
487,560	3,400	.0085	.0023	
516,240	3,600	.0091	.0026	First crack,
14,340	100	.....	.....	Rested one hour under this load.
544,920	3,800	.0103	.0033	
573,600	4,000	.0114	.0040	
602,280	4,200	.0128	.0046	
630,960	4,400	.0127	.0042	
659,640	4,600	.0128	.0021	
683,500	4,766	.....	.....	Ultimate strength.

Marks, C–87.
Composition: Alpha Portland cement, 1; sand, 0; broken stone, 2.
Age, 3 months.
Weight per cubic foot, 151.69 pounds.
Sectional area, 145.41 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,541	100	0.	0.	Initial load.
29,082	200	0.	0.	
58,164	400	.0003	0.	
87,246	600	.0006	.0001	E=5,000,000 pounds per square inch.
116,328	800	.0010	.0002	
145,410	1,000	.0014	.0004	E=4,500,000 pounds per square inch.
174,492	1,200	.0019	.0005	
208,574	1,400	.0022	.0006	
232,656	1,600	.0026	.0006	E=2,941,000 pounds per square inch.
261,738	1,800	.0031	.0006	
290,820	2,000	.0035	.0008	
319,902	2,200	.0038	.0009	
348,984	2,400	.0042	.0010	
378,066	2,600	.0046	.0011	
407,148	2,800	.0051	.0012	
436,230	3,000	.0055	.0013	
465,312	3,200	.0060	.0015	First crack.
494,394	3,400	.0066	.0018	
523,476	3,600	.0072	.0020	
552,558	3,800	.0078	.0020	
581,640	4,000	.0084	.0022	
610,722	4,200	.0091	.0025	
639,804	4,400	.0099	.0029	
668,886	4,600	.0109	.0035	
697,968	4,800	.0110	.0025	
704,000	4,841	.....	.....	Ultimate strength.

Marks, C–57.
Composition: Alpha Portland cement, 1; sand, 2; broken stone, 4.
Age, 7 days.
Weight per cubic foot, 147.88 pounds.
Sectional area, 142.80 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,280	100	0.	0.	Initial load.
28,560	200	.0012	.0008	
42,840	300	.0032	.0024	
57,120	400	.0059	.0048	
71,400	500	.0102	.0083	
85,680	600	.0162	.0137	E=1,000,000 pounds per square inch.
99,960	700	.0228	.0193	First crack.
114,240	800	.0317	.0275	
137,400	962	.....	.....	Ultimate strength.

Marks, C–66.
Composition: Alpha Portland cement, 1; sand, 2; broken stone, 4.
Age, 1 month.
Weight per cubic foot, 145.02 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0004	.0001	
43,164	300	.0008	.0002	
57,552	400	.0011	.0003	
71,940	500	.0014	.0005	
86,328	600	.0018	.0006	E=2,083,000 pounds per square inch.
100,716	700	.0022	.0008	
115,104	800	.0028	.0011	
129,492	900	.0033	.0013	
143,880	1,000	.0040	.0016	E=1,875,000 pounds per square inch.
172,656	1,200	.0054	.0024	
201,432	1,400	.0071	.0034	
230,208	1,600	.0093	.0046	E=1,190,000 pounds per square inch.
258,984	1,800	.0119	.0064	
287,760	2,000	.0154	.0088	
316,536	2,200	.0196	.0117	
313,000	.....	.....	.....	First crack.
345,312	2,400	.0257	.0169	
372,700	2,590	.....	.....	Ultimate strength.

Marks, C–62.
Composition: Alpha Portland cement, 1; sand, 2; broken stone, 4.
Age, 3 months.
Weight per cubic foot, 148.55 pounds.
Sectional area, 142.92 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,292	100	0.	0.	Initial load.
28,584	200	.0001	0.	
42,876	300	.0002	0.	
57,168	400	.0003	0.	
71,460	500	.0004	0.	
85,752	600	.0007	.0001	E = 4,167,000 pounds per square inch.
100,044	700	.0008	.0001	
114,336	800	.0010	.0001	
128,628	900	.0012	.0001	
142,920	1,000	.0014	.0002	E = 3,750,000 pounds per square inch.
171,504	1,200	.0018	.0002	
200,088	1,400	.0023	.0004	
228,672	1,600	.0028	.0005	E = 2,778,000 pounds per square inch.
257,256	1,800	.0034	.0009	
285,840	2,000	.0041	.0011	
314,424	2,200	.0046	.0013	
343,008	2,400	.0052	.0013	
371,592	2,600	.0058	.0016	
400,176	2,800	.0064	.0017	
428,760	3,000	.0074	.0018	
457,344	3,200	.0092	.0021	First crack.
461,000	3,226	.....	.....	Ultimate strength.

Marks, C–90.
Composition: Alpha Portland cement, 1; sand, 2; broken stone, 4.
Age, 6 months.
Weight per cubic foot, 151.64 pounds.
Sectional area, 142.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,256	100	0.	0.	Initial load.
28,512	200	.0001	0.	
42,768	300	.0003	0.	
57,024	400	.0005	0.	
71,280	500	.0007	0.	
85,536	600	.0009	.0001	E = 3,125,000 pounds per square inch.
99,792	700	.0011	.0001	
114,048	800	.0013	.0002	
128,304	900	.0015	.0003	
142,560	1,000	.0017	.0003	E = 3,214,000 pounds per square inch.
171,072	1,200	.0020	.0004	
199,584	1,400	.0023	.0005	
228,096	1,600	.0029	.0007	E = 3,571,000 pounds per square inch.
256,608	1,800	.0033	.0008	
285,120	2,000	.0037	.0009	
313,632	2,200	.0042	.0010	
342,144	2,400	.0046	.0011	
370,656	2,600	.0052	.0013	
142,560	1,000	.....	.....	Rested 1 hour under this load.
399,168	2,800	.0060	.0017	
427,680	3,000	.0067	.0020	
456,192	3,200	.0075	.0023	
484,704	3,400	.0082	.0025	
513,216	3,600	.0092	.0030	
518,000	.....	.....	.....	First crack.
541,728	3,800	.0101	.0035	
570,240	4,000	.0112	.0040	
598,752	4,200	.0120	.0042	
691,000	4,847	.....	.....	Ultimate strength.

Marks, C–22.
Composition: Alpha Portland cement, 1; sand, 3; broken stone, 6.
Age, 1 month.
Weight per cubic foot, 142.78 pounds.
Sectional area, 143.04 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,304	100	0.	0.	Initial load.
28,608	200	.0002	.0001	
42,912	300	.0007	.0002	
57,216	400	.0010	.0003	
71,520	500	.0014	.0006	
85,824	600	.0018	.0006	E = 2,083,000 pounds per square inch.
100,128	700	.0022	.0009	
114,432	800	.0027	.0011	
128,736	900	.0032	.0013	
143,040	1,000	.0037	.0016	E = 2,143,000 pounds per square inch.
171,648	1,200	.0049	.0022	
200,256	1,400	.0061	.0028	
228,864	1,600	.0076	.0036	
257,472	1,800	.0094	.0046	
286,080	2,000	.0112	.0055	First crack.
314,688	2,200	.0135	.0066	
338,100	2,364	.....	.....	Ultimate strength.

Marks, C–21.
Composition: Alpha Portland cement, 1; sand, 3; broken stone, 6.
Age, 3 months.
Weight per cubic foot, 145.48 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0002	0.	
57,888	400	.0004	0.	
72,360	500	.0006	0.	
86,832	600	.0008	.0001	E = 3,571,000 pounds per square inch.
101,304	700	.0010	.0001	
115,776	800	.0012	.0001	
130,248	900	.0015	.0002	
144,720	1,000	.0018	.0002	E = 2,812,000 pounds per square inch.
173,664	1,200	.0023	.0005	
202,608	1,400	.0031	.0007	
231,552	1,600	.0040	.0011	E = 2,000,000 pounds per square inch.
260,496	1,800	.0048	.0013	
289,440	2,000	.0057	.0016	
318,384	2,200	.0068	.0019	
347,328	2,400	.0085	.0027	First crack.
376,272	2,600	.0104	.0035	
405,216	2,800	.0146	.0056	
416,800	2,880	.....	.....	Ultimate strength.

Marks, C–3.
Composition: Alpha Portland cement, 1; sand, 3; broken stone 6.
Age, 6 months.
Weight per cubic foot, 146.09 pounds.
Sectional area, 142.80 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,280	100	0.	0.	Initial load.
28,560	200	.0001	0.	
42,840	300	.0002	0.	
57,120	400	.0003	0.	
71,400	500	.0005	.0001	
85,680	600	.0007	.0001	E = 4,167,000 pounds per square inch.
99,960	700	.0009	.0002	
114,240	800	.0011	.0002	
128,520	900	.0013	.0003	
142,800	1,000	.0015	.0004	E = 4,091,000 pounds per square inch.
171,360	1,200	.0021	.0005	
199,920	1,400	.0028	.0007	
228,480	1,600	.0036	.0011	E = 1,724,000 pounds per square inch.
257,040	1,800	.0046	.0015	
285,600	2,000	.0062	.0022	
314,160	2,200	.0084	.0035	
340,000	.....	.....	.....	First crack.
342,720	2,400	.0117	.0054	
371,280	2,600	.0174	.0090	
375,200	2,627	.....	.....	Ultimate strength.

Marks, C–31.
Composition: Alpha Portland cement, 1; sand, 6; broken stone, 12.
Age, 1 month.
Weight per cubic foot, 139.46 pounds.
Sectional area, 143.52 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,352	100	0.	0.	Initial load.
28,704	200	.0005	.0001	
43,056	300	.0012	.0006	
57,408	400	.0019	.0009	
71,760	500	.0025	.0013	
86,112	600	.0032	.0017	E=1,667,000 pounds per square inch.
100,464	700	.0040	.0021	
114,816	800	.0046	.0025	
129,168	900	.0052	.0028	
143,520	1,000	.0058	.0030	E=1,607,000 pounds per square inch.
172,224	1,200	.0069	.0034	
181,000	.....	.....	.....	First crack.
200,928	1,400	.0071	.0027	
208,400	1,452	.....	.....	Ultimate strength.

Marks, C–42.
Composition: Alpha Portland cement, 1; sand, 6; broken stone, 12.
Age, 3 months.
Weight per cubic foot, 145.17 pounds.
Sectional area, 142.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,208	100	0.	0.	Initial load.
28,416	200	.0003	.0001	
42,624	300	.0008	.0003	
56,832	400	.0013	.0005	
71,040	500	.0020	.0009	
85,248	600	.0026	.0012	E = 1,786,000 pounds per square inch.
99,456	700	.0034	.0017	
113,664	800	.0043	.0022	
127,872	900	.0051	.0029	
142,080	1,000	.0061	.0036	E = 1,800,000 pounds per square inch.
170,496	1,200	.0082	.0049	
198,912	1,400	.0110	.0068	
227,328	1,600	.0161	.0104	First crack.
238,200	1,677	.....	.....	Ultimate strength.

Marks, C–43.
Composition: Alpha Portland cement, 1; sand, 6; broken stone, 12.
Age, 6 months.
Weight per cubic foot, 144.34 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0006	.0001	
57,840	400	.0010	.0002	
72,300	500	.0014	.0004	
86,760	600	.0020	.0007	E=1,923,000 pounds per square inch.
101,220	700	.0025	.0009	
115,680	800	.0032	.0012	
130,140	900	.0039	.0015	
144,600	1,000	.0047	.0020	E=1,667,000 pounds per square inch.
173,520	1,200	.0066	.0031	
202,440	1,400	.0088	.0044	
231,360	1,600	.0114	.0059	
260,280	1,800	.0146	.0082	First crack.
289,200	2,000	.0196	.0114	
297,100	2,055	.....	.....	Ultimate strength.

Marks, D–76.
Composition: Germania Portland cement, 1; sand, 0; broken stone, 2.
Age, 7 days.
Weight per cubic foot, 148.12 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0001	0.	
43,200	300	.0004	0.	
57,600	400	.0008	.0001	
72,000	500	.0012	.0002	
86,400	600	.0016	.0004	E = 2,083,000 pounds per square inch.
100,800	700	.0021	.0005	
115,200	800	.0027	.0007	
129,600	900	.0033	.0010	
144,000	1,000	.0040	.0012	E = 1,607,000 pounds per square inch.
172,800	1,200	.0055	.0020	
201,600	1,400	.0078	.0034	
230,400	1,600	.0098	.0045	E = 1,087,000 pounds per square inch.
259,200	1,800	.0129	.0062	
288,000	2,000	.0160	.0086	
316,800	2,200	.0214	.0126	First crack.
345,600	2,400	.0312	.0205	
379,900	2,638	.....	.....	Ultimate strength.

Marks, D–67.
Composition: Germania Portland cement, 1; sand, 0; broken stone, 2.
Age, 1 month.
Weight per cubic foot, 149.52 pounds.
Sectional area, 143.40 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,340	100	0.	0.	Initial load.
28,680	200	.0001	0.	
43,020	300	.0002	0.	
57,360	400	.0003	0.	
71,700	500	.0005	0.	
86,040	600	.0007	0.	E = 3,571,000 pounds per square inch.
100,380	700	.0010	.0001	
114,720	800	.0012	.0001	
129,060	900	.0015	.0002	
143,400	1,000	.0017	.0003	E = 3,214,000 pounds per square inch.
172,080	1,200	.0023	.0004	
200,760	1,400	.0028	.0006	
229,440	1,600	.0034	.0008	E = 2,778,000 pounds per square inch.
258,120	1,800	.0038	.0010	
286,800	2,000	.0043	.0011	
315,480	2,200	.0046	.0012	
344,160	2,400	.0050	.0014	First crack.
372,840	2,600	.0056	.0016	
401,520	2,800	.0062	.0018	
430,200	3,000	.0070	.0021	
458,880	3,200	.0081	.0024	
487,560	3,400	.0098	.0033	
516,240	3,600	.0112	.....	Ultimate strength.

Marks, D–82.
Composition: Germania Portland cement, 1; sand, 0; broken stone, 2.
Age, 3 months.
Weight per cubic foot, 150.13 pounds.
Sectional area, 143.76 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,376	100	0.	0.	Initial load.
28,752	200	.0002	0.	
43,128	300	.0004	.0001	
57,504	400	.0007	.0001	
71,880	500	.0009	.0002	
86,256	600	.0012	.0003	E = 2,778,000 pounds per square inch.
100,632	700	.0015	.0004	
115,008	800	.0018	.0006	
129,384	900	.0022	.0007	
143,760	1,000	.0025	.0007	E = 2,500,000 pounds per square inch.
172,512	1,200	.0032	.0009	
201,264	1,400	.0039	.0011	
230,016	1,600	.0050	.0017	E = 1,724,000 pounds per square inch.
258,768	1,800	.0059	.0020	
287,520	2,000	.0071	.0024	
316,272	2,200	.0084	.0030	
345,024	2,400	.0101	.0039	
373,776	2,600	.0116	.0047	First crack.
402,528	2,800	.0136	.0058	
431,280	3,000	.0164	.0075	
460,032	3,200	.0184	.0092	
488,784	3,400	.0208	.0107	
517,536	3,600	.0221	.0117	
546,288	3,800	.....	.....	Ultimate strength.

Marks, D–111.
Composition: Germania Portland cement, 1; sand, 0; broken stone, 2.
Age, 6 months.
Weight per cubic foot, 149.63 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,544	100	0.	0.	Initial load.
29,088	200	.0002	0.	
43,632	300	.0004	.0001	
58,176	400	.0006	.0001	
72,720	500	.0007	.0002	
87,264	600	.0009	.0002	E = 3,571,000 pounds per square inch.
101,808	700	.0011	.0003	
116,352	800	.0012	.0003	
130,896	900	.0014	.0003	
145,440	1,000	.0017	.0004	E = 3,461,000 pounds per square inch.
174,528	1,200	.0021	.0004	
203,616	1,400	.0026	.0005	
232,704	1,600	.0032	.0007	E = 2,381,000 pounds per square inch.
261,792	1,800	.0038	.0006	
290,880	2,000	.0043	.0009	
319,968	2,200	.0050	.0010	
349,056	2,400	.0059	.0011	
378,144	2,600	.0067	.0013	
407,232	2,800	.0078	.0017	
436,320	3,000	.0086	.0020	
465,408	3,200	.0101	.0027	
494,496	3,400	.0109	.0030	
523,584	3,600	.0124	.0036	
552,672	3,800	.0137	.0042	First crack.
581,760	4,000	.0150	.0048	
610,848	4,200	.0171	.0067	
639,936	4,400	.0189	.0069	
669,024	4,600	.0222	.0084	
724,000	4,978	.....	.....	Ultimate strength.

Marks, D–59.
Composition: Germania Portland cement, 1; sand, 2; broken stone, 4.
Age, 7 days.
Weight per cubic foot, 149.02 pounds.
Sectional area, 145.30 square inches.
Gauged length, 5″.

Applied load.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,530	100	0.	0.	Initial load.
29,060	200	.0001	0.	
43,590	300	.0004	0.	
58,120	400	.0006	0.	
72,650	500	.0010	.0001	
87,180	600	.0013	.0003	E = 2,500,000 pounds per square inch.
101,710	700	.0017	.0005	
116,240	800	.0022	.0007	
130,770	900	.0028	.0010	
145,300	1,000	.0033	.0012	E = 2,143,000 pounds per square inch.
174,360	1,200	.0045	.0018	
203,420	1,400	.0061	.0028	
232,480	1,600	.0079	.0038	E = 1,351,000 pounds per square inch.
261,540	1,800	.0106	.0054	
290,600	2,000	.0130	.0072	
319,660	2,200	.0161	.0095	First crack.
348,768	2,400	.....	.....	Ultimate strength.

Marks, D–64.
Composition: Germania Portland cement, 1; sand, 2; broken stone, 4.
Age, 1 month.
Weight per cubit foot, 149.64 pounds.
Sectional area, 144.82 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,482	100	0.	0.	Initial load.
28,964	200	.0001	0.	
43,446	300	.0001	0.	
57,928	400	.0002	0.	
72,410	500	.0002	0.	
86,892	600	.0004	0.	
101,374	700	.0005	.0001	
115,856	800	.0006	.0001	
130,338	900	.0007	.0001	
144,820	1,000	.0007	.0000	
173,784	1,200	.0008	−.0005	Micrometer out of order.
202,748	1,400	.0010	−.0007	
231,712	1,600	.0011	−.0010	Micrometer readjusted.
		.0041	.0008	Second loading.
260,676	1,800	.0054	.0009	
289,640	2,000	.0072	.0020	
318,604	2,200	.0094	.0033	
347,568	2,400	.0120	.0050	
376,532	2,600	.0160	.0075	First crack.
405,496	2,800	.0215	.0112	
424,800	2,933	.....	.....	Ultimate strength.

Marks, D–53.
Composition: Germania Portland cement, 1; sand, 2; broken stone, 4.
Age, 3 months.
Weight per cubic foot, 149.91 pounds.
Sectional area, 143.16 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,316	100	0.	0.	Initial load.
28,632	200	.0001	0.	
42,948	300	.0002	0.	
57,264	400	.0003	0.	
71,580	500	.0005	0.	
85,896	600	.0007	0.	E=3,571,000 pounds per square inch.
100,212	700	.0008	0.	
114,528	800	.0011	0.	
128,844	900	.0013	.0001	
143,160	1,000	.0015	.0001	E=3,214,000 ponnds per square inch.
171,792	1,200	.0021	.0003	
200,424	1,400	.0027	.0006	
229,056	1,600	.0036	.0010	E=2,381,000 pounds per square inch.
257,688	1,800	.0045	.0014	
286,320	2,000	.0053	.0018	
314,952	2,200	.0062	.0022	
343,584	2,400	.0071	.0026	
370,000	.....	.....	.....	First crack.
372,216	2,600	.0083	.0033	
400,848	2,800	.0092	.0037	
429,480	3,000	.0108	.0046	
452,000	3,157	.....	.....	Ultimate strength.

Marks, D–96.
Composition: Germania Portland cement, 1; sand, 2; broken stone, 4.
Age, 6 months.
Weight per cubic foot, 148.74 pounds.
Sectional area, 141.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,172	100	0.	0.	Initial load.
28,344	200	.0001	0.	
42,516	300	.0002	0.	
56,688	400	.0004	0.	
70,860	500	.0006	.0001	
85,032	600	.0008	.0002	E=4,167,000 pounds per square inch.
99,204	700	.0009	.0002	
113,376	800	.0012	.0003	
127,548	900	.0014	.0003	
141,720	1,000	.0016	.0004	E=3,750,000 pounds per square inch.
170,064	1,200	.0022	.0006	
198,408	1,400	.0029	.0008	
226,752	1,600	.0040	.0013	E=1,852,000 pounds per square inch.
255,096	1,800	.0045	.0015	
283,440	2,000	.0059	.0020	
311,784	2,200	.0072	.0026	
340,128	2,400	.0084	.0035	
368,472	2,600	.0109	.0049	
390,000	.....	.....	.....	First crack.
396,816	2,800	.0137	.0066	
425,160	3,000	.0170	.0089	
469,000	3,309	.....	.....	Ultimate strength.

Marks, D–11.
Composition: Germania Portland cement, 1; sand, 3; broken stone, 6.
Age, 7 days.
Weight per cubic foot, 145.74 pounds.
Sectional area, 143.15 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,315	100	0.	0.	Initial load.
28,630	200	.0001	0.	
42,945	300	.0005	.0001	
57,260	400	.0009	.0001	
71,575	500	.0013	.0005	
85,890	600	.0020	.0009	E =2,273,000 pounds per square inch.
100,205	700	.0030	.0015	
114,520	800	.0042	.0023	
128,835	900	.0058	.0035	
143,150	1,000	.0077	.0049	E=1,607,000 pounds per square inch,
171,780	1,200	.0113	.0076	
198,400	1,386	.....	.....	Ultimate strength.

Marks, D–19.
Composition: Germania Portland cement, 1; sand, 3; broken stone, 6.
Age, 1 month.
Weight per cubic foot, 148.30 pounds.
Sectional area, 143.99 square inches.
Gauged length, 5.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,399	100	0.	0.	Initial load.
28,798	200	.0002	0.	
43,197	300	.0006	.0001	
57,596	400	.0009	.0002	
71,995	500	.0013	.0002	
86,394	600	.0016	.0005	E=2,273,000 pounds per square inch.
100,793	700	.0021	.0006	
115,192	800	.0026	.0009	
129,591	900	.0033	.0011	
143,990	1,000	.0039	.0015	E=1,875,000 pounds per square inch.
172,788	1,200	.0052	.0021	
201,586	1,400	.0069	.0031	
230,384	1,600	.0088	.0043	E=1,219,000 pounds per square inch.
259,182	1,800	.0126	.0070	
287,980	2,000	.0166	.0101	
290,000	.....	.....	.....	First crack.
316,778	2,200	.0220	.0144	
345,576	2,400	.0311	.0216	
350,100	2,431	.....	.....	Ultimate strength.

Marks, D–17.
Composition: Germania Portland cement, 1; sand, 3; broken stone, 6.
Age, 3 months.
Weight per cubic foot, 150.49 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0003	0.	
57,648	400	.0006	.0001	
72,060	500	.0008	.0001	
86,472	600	.0011	.0002	E=2,778,000 pounds per square inch.
100,884	700	.0013	.0003	
115,296	800	.0017	.0005	
129,708	900	.0020	.0006	
144,120	1,000	.0024	.0008	E=2,812,000 pounds per square inch.
172,944	1,200	.0032	.0011	
201,768	1,400	.0041	.0016	
230,592	1,600	.0051	.0022	E=2,083,000 pounds per square inch.
259,416	1,800	.0068	.0029	
288,240	2,000	.0077	.0037	
317,064	2,200	.0092	.0045	First crack.
345,888	2,400	.0113	.0060	
374,712	2,600	.0137	.0079	
382,000	2,651	.....	.....	Ultimate strength.

Marks, D–8.
Composition: Germania Portland cement, 1; sand, 3; broken stone, 6.
Age, 6 months.
Weight per cubic foot, 148.53 pounds.
Sectional area, 146.01 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,601	100	0.	0.	Initial load.
29,202	200	.0001	0.	
43,803	300	.0002	0.	
58,404	400	.0004	0.	
73,005	500	.0006	0.	
87,606	600	.0009	.0001	E=3,125,000 pounds per square inch.
102,207	700	.0011	.0002	
116,808	800	.0014	.0003	
131,409	900	.0017	.0004	
146,010	1,000	.0020	.0005	E=3,000,000 pounds per square inch.
175,212	1,200	.0027	.0007	
204,414	1,400	.0034	.0010	
233,616	1,600	.0043	.0014	E=1,852,000 pounds per square inch.
262,818	1,800	.0056	.0020	
292,020	2,000	.0070	.0028	
321,222	2,200	.0089	.0039	
350,424	2,400	.0110	.0052	
379,626	2,600	.0139	.0074	
408,828	2,800	.0175	.0098	
430,000	.....	.....	.....	First crack.
438,030	3,000	.0229	.0140	
468,200	3,207	.....	.....	Ultimate strength.

Marks, D–35.
Composition: Germania Portland cement, 1; sand, 6; broken stone, 12.
Age, 7 days.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,556	100	0.	0.	Initial load.
29,112	200	.0016	.0011	
43,668	300	.0043	.0032	
58,224	400	.0067	.0068	
72,780	500	.0140	.0111	First crack.
87,336	600	.0213	.0175	
109,700	754	.....	.....	Ultimate strength.

Marks, D–31.
Composition: Germania Portland cement, 1; sand, 6; broken stone, 12.
Age, 1 month.
Sectional area, 144.59 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,459	100	0.	0.	Initial load.
28,918	200	.0007	.0003	
43,377	300	.0015	.0009	
57,836	400	.0027	.0015	
72,295	500	.0040	.0025	
86,754	600	.0058	.0032	E=961,000 pounds per square inch.
101,213	700	.0081	.0052	
115,672	800	.0105	.0071	
130,131	900	.0141	.0100	
144,590	1,000	.0187	.0134	First crack.
157,300	1,088	.0237	.....	Ultimate strength.

Marks, D–25.
Composition: Germania Portland cement, 1; sand, 6; broken stone, 12.
Age, 3 months.
Sectional area, 142.67 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,267	100	0.	0.	Initial load.
28,534	200	.0002	.0001	
42,801	300	.0007	.0002	
57,068	400	.0012	.0004	
71,335	500	.0017	.0007	
85,602	600	.0023	.0011	E=2,083,000 pounds per square inch.
99,869	700	.0031	.0015	
114,136	800	.0039	.0019	
128,403	900	.0046	.0024	
142,670	1,000	.0055	.0028	E=1,667,000 pounds per square inch.
171,204	1,200	.0077	.0040	
182,000	1,276	.....	.....	Ultimate strength.

Marks, D–40.
Composition: Germania Portland cement, 1; sand, 6; broken stone, 12.
Age, 6 months.
Sectional area, 141.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,160	100	0.	0.	Initial load.
28,320	200	.0005	.0002	
42,480	300	.0012	.0007	
56,640	400	.0020	.0012	
70,800	500	.0029	.0018	
84,960	600	.0038	.0024	E=1,786,000 pounds per square inch.
99,120	700	.0050	.0032	
113,280	800	.0065	.0044	
127,440	900	.0083	.0056	
141,600	1,000	.0102	.0069	E=1,364,000 pounds per square inch.
142,000	.....	.....	.....	First crack.
155,300	1,097	.....	.....	Ultimate strength.

Marks, E–73.
Composition: Alsen's Portland cement, 1; sand, 0; broken stone, 2.
Age, 10 days.
Weight per cubic foot, 147.83 pounds.
Sectional area, 143.64 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,364	100	0.	0.	Initial load.
28,728	200	.0001	0.	
43,092	300	.0003	0.	
57,456	400	.0006	.0001	
71,820	500	.0009	.0002	
86,184	600	.0012	.0002	E=2,500,000 pounds per square inch.
100,548	700	.0015	.0003	
114,912	800	.0018	.0005	
129,276	900	.0022	.0006	
143,640	1,000	.0026	.0007	E=2,368,000 pounds per square inch.
172,368	1,200	.0035	.0011	
201,096	1,400	.0045	.0015	
229,824	1,600	.0057	.0022	E=1,515,000 pounds per square inch.
258,552	1,800	.0072	.0029	
287,280	2,000	.0090	.0038	
316,008	2,200	.0111	.0051	
340,000	.....	.....	.....	First crack.
344,736	2,400	.0137	.0070	
373,464	2,600	.0165	.0091	
402,192	2,800	.0195	.0113	
430,920	3,000	.0243	.0150	
471,000	3,279	.....	.....	Ultimate strength.

Marks, E–88.
Composition: Alsen's Portland cement, 1; sand, (
Age, 1 month.
Weight per cubic foot, 148.03 pounds.
Sectional area, 144.00 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Rema
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0002	0.	
43,200	300	.0005	.0001	
57,600	400	.0007	.0001	
72,000	500	.0010	.0002	
86,400	600	.0013	.0002	E=2,273,000 pounds per s
100,800	700	.0017	.0004	
115,200	800	.0022	.0006	
129,600	900	.0026	.0008	
144,000	1,000	.0032	.0009	E=1,956,000 pounds per s
172,800	1,200	.0043	.0013	
201,600	1,400	.0053	.0017	
230,400	1,600	.0063	.0021	E=1,429,000 pounds per s
259,200	1,800	.0077	.0025	
288,000	2,000	.0093	.0035	
316,800	2,200	.0111	.0041	
345,600	2,400	.0131	.0055	
374,400	2,600	.0150	.0069	First crack.
403,200	2,800	.0185	.0091	
432,000	3,000	.0252	.0150	
492,500	3,420	.....	.....	Ultimate strength.

Marks, E–85.
Composition: Alsen's Portland cement, 1; sand, (
Age, 3 months.
Weight per cubic foot, 150.52 pounds.
Sectional area, 143.03 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Rema
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,303	100	0.	0.	Initial load.
28,606	200	.0001	0.	
42,909	300	.0004	.0001	
57,212	400	.0008	.0002	
71,515	500	.0011	.0003	
85,818	600	.0014	.0003	E=2,273,000 pounds per s
100,121	700	.0017	.0004	
114,424	800	.0020	.0006	
128,727	900	.0024	.0007	
143,030	1,000	.0028	.0008	E=2,250,000 pounds per s
171,636	1,200	.0035	.0009	
200,242	1,400	.0041	.0010	
228,848	1,600	.0047	.0012	E=1,515,000 pounds per s
257,454	1,800	.0059	.0014	
286,060	2,000	.0073	.0020	
314,666	2,200	.0093	.0030	First crack.
343,272	2,400	.0119	.0043	
371,878	2,600	.0150	.0059	
400,484	2,800	.0190	.0082	
429,090	3,000	.0275	.0140	
449,700	3,144	.....	.....	Ultimate strength.

Marks, E–112.
Composition: Alsen's Portland cement, 1; sand, 0; broken stone, 2.
Age, 6 months.
Weight per cubic foot, 147.13 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	.0001	
43,380	300	.0004	.0001	
57,840	400	.0006	.0002	
72,300	500	.0008	.0002	
86,760	600	.0010	.0003	E=3,571,000 pounds per square inch.
101,220	700	.0012	.0003	
115,680	800	.0015	.0004	
130,140	900	.0017	.0005	
144,600	1,000	.0020	.0006	E=3,214,000 pounds per square inch.
173,520	1,200	.0025	.0007	
202,440	1,400	.0031	.0008	
231,360	1,600	.0037	.0010	E=2,273,000 pounds per square inch.
260,280	1,800	.0042	.0011	
289,200	2,000	.0048	.0012	
318,120	2,200	.0053	.0013	
347,040	2,400	.0059	.0014	
375,960	2,600	.0065	.0015	
404,880	2,800	.0072	.0017	
433,800	3,000	.0079	.0019	
435,000	.....	.....	.....	First crack.
462,720	3,200	.0088	.0022	
491,640	3,400	.0098	.0027	
520,560	3,600	.0110	.0033	
549,480	3,800	.0124	.0041	
578,400	4,000	.0138	.0049	
607,320	4,200	.0158	.0064	
636,240	4,400	.0178	.0078	
665,160	4,600	.0202	.0093	
694,080	4,800	.0238	.0120	
775,000	5,360	.....	.....	Ultimate strength.

Marks, E–49.
Composition: Alsen's Portland cement, 1; sand, 2; broken stone, 4.
Age, 10 days.
Weight per cubic foot, 147.93 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0001	0.	
43,200	300	.0004	.0001	
57,600	400	.0007	.0001	
72,000	500	.0011	.0002	
86,400	600	.0014	.0004	E = 2,500,000 pounds per square inch.
100,800	700	.0018	.0006	
115,200	800	.0024	.0010	
129,600	900	.0031	.0013	
144,000	1,000	.0038	.0017	E = 2,143,000 pounds per square inch.
172,800	1,200	.0055	.0030	
201,600	1,400	.0086	.0051	
230,400	1,600	.0127	.0084	
259,200	1,800	.0214	.0156	
268,100	1,862	.....	.....	Ultimate strength.

Marks, E–67.
Composition: Alsen's Portland cement, 1; sand, 2; broken stone, 4.
Age, 1 month.
Weight per cubic foot, 146.28 pounds.
Sectional area, 143.52 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,352	100	0.	0.	Initial load.
28,704	200	.0001	0.	
43,056	300	.0004	0.	
57,408	400	.0006	.0001	
71,760	500	.0008	.0001	
86,112	600	.0011	.0002	E=2,778,000 pounds per square inch.
100,464	700	.0013	.0003	
114,816	800	.0017	.0004	
129,168	900	.0020	.0006	
143,520	1,000	.0024	.0007	E=2,647,000 pounds per square inch.
172,224	1,200	.0032	.0010	
200,928	1,400	.0044	.0016	
229,632	1,600	.0057	.0023	E=1,471,000 pounds per square inch.
258,336	1,800	.0080	.0037	
287,040	2,000	.0105	.0054	
315,744	2,200	.0151	.0089	First crack.
340,600	2,373	.....	.....	Ultimate strength.

Marks, E–56.
Composition: Alsen's Portland cement, 1; sand, 2; broken stone, 4.
Age, 3 months.
Weight per cubic foot, 150.01 pounds.
Sectional area, 143.04 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
14,304	100	0.	0.	Initial load.
28,608	200	.0002	0.	
42,912	300	.0004	.0001	
57,216	400	.0006	.0001	
71,520	500	.0009	.0001	
85,824	600	.0012	.0003	E=2,778,000 pounds per square inch.
100,128	700	.0014	.0004	
114,432	800	.0017	.0004	
128,736	900	.0020	.0005	
143,040	1,000	.0024	.0006	E=2,500,000 pounds per square inch.
171,648	1,200	.0033	.0010	
200,256	1,400	.0042	.0013	
228,864	1,600	.0058	.0023	E=1,389,000 pounds per square inch.
257,472	1,800	.0072	.0028	
286,080	2,000	.0093	.0039	
314,688	2,200	.0122	.0058	
343,296	2,400	.0164	.0086	First crack.
371,904	2,600	.0249	.0148	Ultimate strength.

Marks, E–94.
Composition: Alsen's Portland cement, 1; sand, 2; broken stone, 4.
Age, 6 months.
Weight per cubic foot, 147.97 pounds.
Sectional area, 142.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,232	100	0.	0.	Initial load.
28,464	200	.0002	.0001	
42,696	300	.0003	.0001	
56,928	400	.0005	.0002	
71,160	500	.0007	.0002	
85,392	600	.0009	.0003	E=4,167,000 pounds per square inch.
99,624	700	.0010	.0003	
113,856	800	.0012	.0004	
128,088	900	.0014	.0004	
142,320	1,000	.0016	.0005	E=4,091,000 pounds per square inch.
170,784	1,200	.0021	.0006	
199,248	1,400	.0026	.0007	
227,712	1,600	.0031	.0009	E=2,631,000 pounds per square inch.
256,176	1,800	.0037	.0011	
284,640	2,000	.0043	.0013	
313,104	2,200	.0051	.0017	
341,568	2,400	.0060	.0020	
370,032	2,600	.0070	.0024	
398,496	2,800	.0084	.0031	
426,960	3,000	.0099	.0039	
428,000	.....	.....	.....	First crack.
455,424	3,200	.0118	.0050	
483,888	3,400	.0138	.0062	
512,352	3,600	.0167	.0080	
540,816	3,800	.0282	.0157	Ultimate strength.

Marks, E–5.
Composition: Alsen's Portland cement, 1; sand, 3; broken stone, 6.
Age, 10 days.
Weight per cubic foot, 148.28 pounds.
Sectional area, 143.75 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,375	100	0.	0.	Initial load.
28,750	200	.0001	0.	
43,125	300	.0003	0.	
57,500	400	.0007	.0001	
71,875	500	.0013	.0003	
86,250	600	.0022	.0007	E=1,667,000 pounds per square inch.
100,625	700	.0033	.0014	
115,000	800	.0046	.0023	
129,375	900	.0060	.0033	
143,750	1,000	.0076	.0045	E=1,452,000 pounds per square inch.
172,500	1,200	.0110	.0068	
201,250	1,400	.0153	.0103	First crack.
230,000	1,600	.0207	.0146	
253,400	1,763	.....	.....	Ultimate strength.

Marks, E–19.
Composition: Alsen's Portland cement, 1; sand, 3; broken stone, 6.
Age, 1 month.
Weight per cubic foot, 149.62 pounds.
Sectional area, 141.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,172	100	0.	0.	Initial load.
28,344	200	.0002	0.	
42,516	300	.0005	.0001	
56,688	400	.0008	.0001	
70,860	500	.0011	.0002	
85,032	600	.0015	.0004	E=2,273,000 pounds per square inch.
99,204	700	.0020	.0007	
113,376	800	.0026	.0010	
127,548	900	.0033	.0012	
141,720	1,000	.0041	.0017	E=1,875,000 pounds per square inch.
170,064	1,200	.0061	.0030	
198,408	1,400	.0085	.0044	
226,752	1,600	.0113	.0064	
240,000	.....	.....	.....	First crack.
255,096	1,800	.0141	.0083	
283,440	2,000	.0175	.0109	
304,100	2,146	.....	.....	Ultimate strength.

Marks, E–15.
Composition: Alsen's Portland cement, 1; sand, 3; broken stone, 6.
Age, 3 months.
Weight per cubic foot, 149.14 pounds.
Sectional area, 144.71 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,471	100	0.	0.	Initial load.
28,942	200	.0001	0.	
43,413	300	.0004	0.	
57,884	400	.0006	.0001	
72,355	500	.0009	.0001	
86,826	600	.0011	.0002	E=2,778,000 pounds per square inch.
101,297	700	.0014	.0003	
115,768	800	.0018	.0005	
130,239	900	.0021	.0006	
144,710	1,000	.0025	.0007	E=2,500,000 pounds per square inch.
173,652	1,200	.0033	.0010	
202,594	1,400	.0044	.0015	
231,536	1,600	.0055	.0021	E=1,667,000 pounds per square inch.
260,478	1,800	.0068	.0027	
289,420	2,000	.0085	.0037	
318,362	2,200	.0102	.0048	
347,304	2,400	.0127	.0064	First crack.
376,246	2,600	.0171	.0103	
381,000	2,633	.....	.....	Ultimate strength.

Marks, E–22.
Composition: Alsen's Portland cement, 1; sand, 3; broken stone, 6.
Age, 6 months.
Weight per cubic foot, 147.24 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0002	0.	
57,936	400	.0004	0.	
72,420	500	.0006	.0001	
86,904	600	.0008	.0001	E=3,571,000 pounds per square inch.
101,388	700	.0010	.0002	
115,872	800	.0012	.0002	
130,356	900	.0014	.0003	
144,840	1,000	.0017	.0004	E=3,461,000 pounds per square inch.
173,808	1,200	.0023	.0006	
202,776	1,400	.0032	.0010	
231,744	1,600	.0041	.0013	E=1,724,000 pounds per square inch.
260,712	1,800	.0053	.0018	
289,680	2,000	.0067	.0025	
318,648	2,200	.0089	.0037	
347,616	2,400	.0108	.0047	
376,584	2,600	.0137	.0067	
405,552	2,800	.0179	.0097	
430,000	.....	.....	.....	First crack.
434,520	3,000	.0245	.0145	
461,000	3,183	.....	.....	Ultimate strength.

Marks, E–26.
Composition: Alsen's Portland cement, 1; sand, 6; broken stone, 12.
Age, 10 days.
Sectional area, 143.99 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,399	100	0.	0.	Initial load.
28,798	200	.0021	.0017	
43,197	300	.0074	.0061	
57,596	400	.0138	.0119	
67,600	.....	.....	.....	First crack.
81,800	568	.....	.....	Ultimate strength.

Marks, E–36.
Composition: Alsen's Portland cement, 1; sand, 6; broken stone, 12.
Age, 1 month.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0015	.0012	Defective bearing surface, doubtless influencing micrometer readings.
43,272	300	.0029	.0022	
57,696	400	.0039	.0028	
72,120	500	.0046	.0034	
86,544	600	.0058	.0037	E = 1,562,000 pounds per square inch.
100,968	700	.0059	.0041	First crack.
115,392	800	.0065	.0044	
129,816	900	.0076	.0048	
136,200	944	.....	.....	Ultimate strength.

Marks, E–41.
Composition: Alsen's Portland cement, 1; sand, 6; broken stone, 12.
Age, 3 months.
Sectional area, 143.39 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,339	100	0.	0.	Initial load.
28,678	200	.0005	.0002	
43,017	300	.0012	.0007	
57,356	400	.0020	.0011	
71,695	500	.0028	.0016	
86,034	600	.0040	.0024	E = 1,562,000 pounds per square inch.
100,373	700	.0055	.0034	
114,712	800	.0071	.0044	
129,051	900	.0088	.0056	
143,390	1,000	.0116	.0077	E = 1,154,000 pounds per square inch.
157,729	1,100	.0147	.0102	First crack.
166,100	1,158	.....	.....	Ultimate strength.

Marks, E 43.
Composition: Alsen's Portland cement, 1; sand, 6; broken stone, 12.
Age, 6 months.
Sectional area, 143.64 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,364	100	0.	0.	Initial load.
28,728	200	.0005	.0002	
43,092	300	.0011	.0005	
57,456	400	.0016	.0008	
71,820	500	.0021	.0011	
86,184	600	.0028	.0014	E = 1,786,000 pounds per square inch.
100,548	700	.0037	.0020	
114,912	800	.0047	.0026	
129,276	900	.0060	.0034	
143,640	1,000	.0074	.0043	E = 1,452,000 pounds per square inch.
172,368	1,200	.0116	.0076	
201,096	1,400	.0190	.0131	First crack.
204,000	1,420	.....	.....	Ultimate strength.

Marks, C 3.
Composition: Alpha Portland cement, 1; sand, 0; broken stone,
Age, 6 months.
Weight per cubic foot, 149.26 pounds.
Sectional area, 100.80 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
10,080	100	0.	0.	Initial load.
20,160	200	0.	0.	
30,240	300	.0001	0.	
40,320	400	.0003	0.	
50,400	500	.0005	0.	
60,480	600	.0006	.0001	E = 5,000,000 pounds per square inch.
70,560	700	.0008	.0001	
80,640	800	.0010	.0001	
90,720	900	.0011	.0001	
100,800	1,000	.0012	.0001	E = 4,091,000 pounds per square inch
120,960	1,200	.0016	.0002	
141,120	1,400	.0019	.0003	
161,280	1,600	.0022	.0004	E = 3,846,000 pounds per square inch.
181,440	1,800	.0026	.0005	
201,600	2,000	.0030	.0006	
201,600	2,000	.0031	.....	Second application of load, which was sustained one hour.
201,600	2,000	.0034	.0010	
221,760	2,200	.0037	.0011	
241,920	2,400	.0040	.0011	
262,080	2,600	.0044	.0011	
282,240	2,800	.0049	.0012	
302,400	3,000	.0054	.0015	
322,560	3,200	.0058	.0015	
342,720	3,400	.0062	.0016	
362,880	3,600	.0066	.0018	
383,040	3,800	.0073	.0021	
403,200	4,000	.0079	.0023	
423,360	4,200	.0082	.0025	
443,520	4,400	.0087	.0026	
463,680	4,600	.0092	.0029	
483,840	4,800	.0098	.0030	
504,000	5,000	.0102	.0031	
524,160	5,200	.0107	.0032	
544,320	5,400	.0112	.0034	First crack.
564,480	5,600	.0119	.0037	
584,640	5,800	.0122	.0038	
604,800	6,000	.0128	.0040	
624,960	6,200	.0132	.0042	
645,120	6,400	.0136	.0044	
665,280	6,600	.0140	.0045	
685,440	6,800	.0145	.0051	
705,600	7,000	.0130	.0044	
717,000	7,113	.....	.....	Ultimate strength.

CONCRETE AND MORTAR CUBES

MADE AT

WATERTOWN ARSENAL.

783

CHEMICAL ANALYSES OF PORTLAND CEMENTS USED IN WATERTOWN ARSENAL CONCRETE.

Cement.	Silica.	Oxide of iron.	Alumina.	Lime.	Magnesia.	Sulphur trioxide.	Manganous oxide.	Carbon dioxide.
Alpha.....	20.00	2.80	10.87	58.66	3.35	1.34	0.40	2.56
Star.....	21.78	2.50	9.47	56.34	3.61	1.91	0.50	3.94
Standard.....	22.50	2.60	11.98	51.44	3.61	1.57	0.32	5.96
Steel.....	31.02	Trace	14.60	42.16	4.05	3.36	.....	4.81
Alsen	20.67	2.10	10.90	57.31	2.32	2.32	.....	4.45

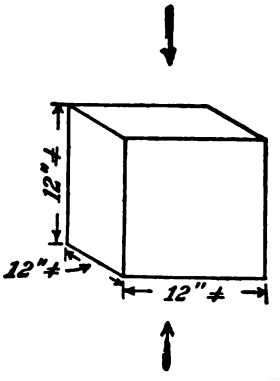
WEIGHT AND VOLUME OF THE INGREDIENTS AND OF THE RESULTING MORTARS AND CONCRETES.

Marks on cubes made.	Composition.			Brand of cement.	Quantities.						Water used.			Concrete produced.		Approximate weight of material when tested, per cent of original mixture.
					Cement.		Sand.		Stone.							
	Cement.	Sand.	Broken stone.		Volume.	Weight.	Volume.	Weight.	Volume.	Weight.	Volume.	Weight.	Per cent of cement by weight.	Volume.	Per cent of ingredients.	
					Cub. ft.	*Pounds.*	*Cub. ft.*	*Pounds.*	*Cub. ft.*	*Pounds.*	*Cub. ft.*	*Pounds.*	*Per cent.*	*Cub ft.*	*Per cent.*	*Per cent.*
1-5	1	1	0.....	Alpha Portland.....	3	305	3	299⅜	0	0	1.13	70⅜	23.2	5.07	71.1	102.6
6-10	1	2	0.....	.....do.....	2	203⅛	4	397	0	0	0.90	56¼	27.6	5.15	74.6	105.4
11-13	1	3	0.....	.....do.....	1	102⅛	3	301⅛	0	0	0.61	38	37.1	3.37	73.1	102.4
14-18	1	4	0.....	.....do.....	1	101⅛	4	398⅛	0	0	0.78	49	48.3	4.40	76.1	97.5
19-24	1	5	0.....	.....do.....	1	103	5	503½	0	0	1.07	66⅜	64.8	5.37	75.9	95
25-30	1	6	0.....	.....do.....	1	102	6	609½	0	0	0.99	62	60.8	6.07	76.0	91.9
31-37	1	7	0.....	.....do.....	1	95	7	716⅛	0	0	1.02	63⅛	66.8	7.25	80.4	92.6
38-42	1	1	0.....	Atlas Portland.....	3	308	3	307⅛	0	0	1.41	88	28.6	5.04	68.0	101.9
43-47	1	1	0.....	Star Portland.....	3	302⅛	3	300	0	0	1.42	89	29.4	5.00	67.4	96.7
48-52	1	1	0.....	Steel Portland.....	3	264⅛	3	305	0	0	1.42	88⅛	33.5	5.00	67.4	95.1
53-57	1	1	0.....	Saylor's Portland.....	3	291	3	304⅛	0	0	1.31	82	28.1	5.00	68.4	98.7
58-62	1	1	0.....	Germania Portland.....	3	304⅛	3	300⅛	0	0	1.28	80½	26.3	5.00	68.7	98.1
63-67	1	1	0.....	Hoffman's Rosendale.....	3	226⅛	3	309	0	0	1.25	78½	34.5	4.71	65.0	97.4
68-72	1	1	0.....	Norton's Rosendale.....	3	228½	3	301	0	0	1.36	85½	37.3	4.65	63.2	96.1
73-77	1	[1]1	0.....	Alpha Portland.....	3	307⅜	3	[1]304½	0	0	1.39	86⅜	28.2	5.10	69.0	98.5
78-82	1	[1]2	0.....	.....do.....	2	200⅛	4	[1]426½	0	0	1.31	81⅜	40.7	5.25	71.8	97.1
83-90	1	1	3—¾" trap....	Alsen's Portland.....	2	202	2	209⅛	6	589⅛	1.25	77	38.1	7.25	64.4	99.5
91-94	1	2	2—1 2½" trap, 1 ¾" trap.	Alpha Portland.....	1	101⅛	2	206⅛	2	197⅛	0.70	43⅛	42.9	3.65	64.0	96.8
95-99	1	2	3—1½ 2½" trap, 1½ ¾" trap.	.....do.....	1	103	2	204	3	298⅛	0.69	43	41.7	4.25	63.5	97.8
100-104	1	2	4—2 2½" trap, 2 ¾" trap.	.....do.....	1	100⅜	2	211	4	406⅛	0.79	49⅛	49.1	5.00	64.2	97.0
105-110	1	2	5—2½ 2½" trap, 2½ ¾" trap.	.....do.....	1	104	2	211	5	519⅜	0.82	51⅜	49.8	5.75	65.2	97.1
111-117	1	2	6—3 2½" trap, 3 ¾" trap.	.....do.....	1	103½	2	210⅛	6	618⅛	0.90	56⅛	54.7	6.38	64.4	97.4
118-122	1	2	4—2½" trap....	.....do.....	1	102½	2	208	4	416⅛	0.80	50	48.9	5.00	64.1	97.1
123-129	1	3	6—2½" trap....	.....do.....	1	105	3	296⅛	6	605⅜	1.13	70	66.7	7.00	62.8	95.7
130-134	1	4	8—2½" trap....	.....do.....	⅛	52	2	201⅜	4	408	0.72	45½	87.0	4.71	70.7	95.4
135-140	1	5	10—2½" trap....	.....do.....	⅛	50⅛	2⅛	258⅛	5	506½	0.81	50⅜	100.0	5.77	65.5	98.9
141-147	1	6	12—2½" trap....	.....do.....	⅛	51½	3	295½	6	614⅛	1.02	63⅜	121.4	6.87	65.3	98.0
148-158	1	2	4—¼" trap....	.....do.....	1	101⅛	2	198⅛	4	410½	0.90	56	55.3	5.25	66.5	97.7
160-167	1	3	6—¼" trap....	.....do.....	1	102½	3	289⅜	6	614	1.16	72⅛	71.1	7.50	67.2	97.6
176-180	1	4	8—¼" trap....	.....do.....	⅛	51⅜	2	196	4	404⅛	0.80	50	76.6	5.00	68.5	96.6

186–191	1	5	10—¼" trap	do	¼	52½	2½	245	5	508	1.00	62½	118.5	6.00	66.7	94.0
198–205	1	6	12—¼" trap	do	¼	52½	3	294½	6	601½	1.26	78½	149.5	7.27	67.6	92.9
214–217	1	2	2—¼" trap	do	1	101½	2	193	2	200½	0.79	49½	48.9	3.87	66.8	97.2
218–222	1	2	3—¼" trap	do	1	102½	2	190	3	302½	0.81	50½	49.4	4.46	65.5	97.7
223–228	1	2	5—¼" trap	do	1	103	2	198	5	497½	0.94	59	57.3	5.77	64.5	96.6
229–235	1	2	6—¼" trap	do	1	102	2	198	6	606	0.98	61½	60.3	6.67	66.8	97.9
236–243	1	2	7—¼" trap	do	1	103½	2	194½	7	710	1.02	63½	61.4	7.67	69.6	97.1
244–248	1	2	8—¼" trap	do	¼	52½	1	96½	4	403	0.62	39	74.3	4.25	69.4	97.3
249–253	1	2	8—¼" trap	do	¼	52½	1	95½	4	397	0.56	35	66.7	4.25	70.5	98.2
254–258	1	2	9—¼" trap	do	¼	52½	1	99	4¼	449	0.62	39	74.3	4.75	71.7	95.8
259–263	1	2	9—¼" trap	do	¼	52½	1	98	4¼	454½	0.61	38	72.4	4.67	70.6	97.1
264–267	1	2	2—1¼" trap	do	1	100½	2	194	2	197½	0.76	47½	47.3	3.67	68.7	94.7
268–272	1	2	3—1¼" trap	do	1	102	2	198½	3	296	0.83	52	51.0	4.25	62.2	95.6
273–277	1	2	4—1¼" trap	do	1	99	2	192	4	394	0.88	55	55.6	4.79	60.8	95.5
278–283	1	2	5—1¼" trap	do	1	99	2	189	5	493½	0.74	46	46.5	5.42	62.0	98.7
284–289	1	2	6—1¼" trap	do	1	100½	2	194	6	589	1.04	65	64.7	6.08	60.6	97.4
290–296	1	2	7—1¼" trap	do	1	102½	2	190	7	688	1.15	72	70.2	7.08	63.5	99.1
297–300	1	2	8—1¼" trap	do	¼	52½	1	95½	4	399	0.65	40½	77.1	4.08	66.3	99.3
301–304	1	2	8—1¼" trap	do	¼	52½	1	94½	4	396½	0.60	37	70.5	4.00	65.6	99.0
402–406	1	2	4—2½" trap	do	1	99½	2	200½	4	403	1.01	63	63.3	4.92	61.4	95.8
407–411	1	2	4—2½" trap	Steel, Portland	1	83½	2	198½	4	394	0.86	54	64.7	5.00	63.6	104.2
427–431	1	2	4—2½" trap	Norton's Rosendale	1	77	2	205	4	410	0.86	54	70.1	4.75	60.4	93.5
432–436	1	2	0	do	2	157	4	404	0	0	1.30	81½	51.9	5.00	68.5	93.4
442–446	1	2	4—1½" to 3" pebbles.	Alpha Portland	1	114	2	200.	4	406½	0.89	56½	48.7	5.00	63.4	95.9
452–456	1	2	4—1½" to 2½" broken brick	do	1	114	2	195	4	289½	1.18	73½	64.7	5.00	61.1	97.2
462–468	1	8	6—1½" to 2½" broken brick	do	1	113½	8	295½	6	416½	1.50	94	82.8	6.75	58.7	95.9
480–483	1	a 1	0	do	2	225½	2	a 196	0	0	1.18	74	32.8	3.58	69.1	98.0
484–486	1	a 2	0	do	1	112	2	a 191	0	0	0.72	45	40.2	2.54	68.3	98.4
487–490	1	a 3	0	do	1	111	3	a 284½	0	0	0.94	59	58.1	3.50	70.8	98.2
491–495	1	a 2	4—2½" trap	do	1	110	2	a 186½	4	399	1.04	65	59.1	4.79	59.5	96.9

a Granite dust.

COMPRESSION TESTS.



Marks.	Brand of cement.	Composition.			Age.	Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
		Cement.	Sand.	Broken stone.		Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
					Mos.	*Lbs.*	*Ozs.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
1	Alpha	1	1	0	4	137	0	137.3	11.86	12.07	12.05	145.44	782,000	752,000	5,170	Cubes Nos. 1 to 13, inclusive, set 1 day in air and 119 days in water. All other cubes of this series were set in air only.
2	Portland				4	136	0	135.8	11.91	12.08	12.08	145.32	558,000	558,000	3,839	
3					4	135	0	135.7	11.85	12.05	12.04	145.08	490,000	525,000	3,619	
4					4	138	0	136.9	11.95	12.05	12.10	145.80	731,000	731,000	5,014	
5					4	137	0	136.9	11.90	12.04	12.07	145.32	612,000	612,000	4,211	
6	Alpha	1	2	0	4	133	8	134.1	11.91	12.04	12.00	144.48	369,800	369,800	2,560	
7	Portland				4	135	8	135.2	11.92	12.04	12.07	145.32	335,600	335,600	2,309	
8					4	133	0	133.8	11.87	12.03	12.08	144.72	400,400	400,400	2,767	
9					4	135	0	133.8	11.96	12.05	12.10	145.80	362,000	362,000	2,488	
10					4	135	0	134.1	11.95	12.11	12.02	145.56	351,000	351,000	2,411	
11	Alpha	1	3	0	4	134	0	133.1	12.01	12.04	12.08	144.84	241,500	241,500	1,667	
12	Portland				4	134	0	133.9	11.93	12.05	12.08	144.96	258,500	258,500	1,783	
13					4	135	0	134.3	11.91	12.08	12.12	145.80	289,600	289,600	1,986	

14	Alpha	1	4	0	4	120	0	119.6	11.95	12.06	12.03	145.08	111,800	111,800	767	
15	Portland				4	120	0	119.7	12.04	12.02	11.97	143.88	125,800	125,800	874	
18					4	125	0	123.5	12.01	12.06	12.07	145.56	123,500	123,500	848	
19	Alpha	1	5	0	4	118	0	118.6	11.86	12.02	12.06	144.96	82,100	82,100	566	
20	Portland				4	118	0	118.0	11.97	12.02	12.01	144.36	68,600	68,600	475	
21					4	118	0	119.3	11.86	12.02	11.99	144.12	64,400	64,400	447	
22					4	118	8	118.9	12.00	12.00	11.96	143.52	63,400	63,400	442	
23					4	118	8	118.4	11.97	12.04	12.00	144.48	68,000	68,000	471	
24					4	123	0	122.4	11.99	12.02	12.05	144.84	113,600	115,000	794	
25	Alpha	1	6	0	4	116	12	117.3	11.90	12.02	12.02	144.48	25,100	25,100	174	
26	Portland				4	116	12	116.4	11.90	12.07	12.07	145.68	21,600	21,600	148	
27					4	115	12	114.8	11.95	12.10	12.05	145.80	27,400	27,400	188	
28					4	110	.....	Corner gone.	11.99	12.00	12.08	144.96	21,100	21,100	146	
29					4	118	.....	117.8	11.95	12.02	12.05	144.84	33,100	33,100	229	
30					4	118	8	118.0	11.97	12.06	12.02	144.96	33,100	33,100	228	
31	Alpha	1	7	0	4	112	4	112.1	11.92	12.02	12.08	145.20	17,400	17,400	120	
33	Portland				4	111	0	110.4	12.02	12.01	12.03	144.48	14,600	14,600	101	
35					4	112	0	111.6	11.98	12.00	12.05	144.60	21,200	21,200	147	
37					4	112	0	111.8	11.88	12.08	12.06	145.68	15,200	15,200	104	
38	Atlas	1	1	0	4	141	8	140.9	12.02	12.01	12.02	144.36	696,000	802,000	5,555	
39	Portland				4	142	8	142.0	11.94	12.06	12.04	145.20	755,040	809,000	5,572	
40					4	142	0	141.4	11.98	12.03	12.04	144.84	.....	810,000	5,592	Sustained load 5 minutes. Test discontinued; cube not fractured.
41					4	142	8	141.7	11.99	12.07	12.01	144.96	810,000	811,000	5,595	Maximum load sustained 8 minutes, load then released to 400,000 pounds and 811,000 pounds again applied. The cube immediately failed upon the second application of this load.
42					4	142	8	141.4	11.99	12.04	12.06	145.20	804,000	804,000	5,587	
43	Star	1	1	0	4	133	8	134.5	12.03	12.02	11.86	142.56	780,000	780,000	5,471	
44	Portland				4	134	0	134.7	11.88	12.03	12.08	144.72	761,500	761,500	5,262	
45					4	134	0	134.6	11.82	12.08	12.05	145.56	620,000	646,000	4,438	
46					4	133	8	134.7	11.88	12.00	12.01	144.12	734,000	734,000	5,093	
47					4	134	0	134.2	11.95	12.03	12.00	144.36	716,200	716,200	4,961	
48	Steel	1	1	0	4	124	0	126.4	11.72	12.00	12.05	144.60	243,800	243,800	1,686	
49	Portland				4	125	8	126.1	11.92	12.01	12.01	144.24	251,500	251,500	1,744	
50					4	125	8	127.1	11.84	12.00	12.01	144.12	262,000	262,000	1,817	
51					4	125	8	126.7	11.89	11.99	12.01	144.00	239,900	239,900	1,666	
52					4	125	8	126.6	11.89	12.00	12.01	144.12	259,416	259,416	1,800	

COMPRESSION TESTS—Continued.

Marks.	Brand of cement.	Composition.			Age.	Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
		Cement.	Sand.	Broken stone.		Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
					Mos.	*Lbs.*	*Ozs.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
53	Saylor's	1	1	0	4	134	0	134.9	11.85	12.04	12.03	144.84	598,600	598,600	4,133	
54	Portland				4	133	0	135.0	11.80	12.00	12.02	144.24	589,800	589,800	4,089	
55					4	133	8	134.4	11.84	12.03	12.05	144.96	552,600	552,600	3,812	
56					4	133	8	134.4	11.83	12.06	12.03	145.08	512,000	568,000	3,915	
57					4	134	8	135.1	11.88	12.05	12.02	144.84	571,400	571,400	3,945	
58	Germania	1	1	0	4	135	0	134.2	11.99	12.02	12.06	144.96	613,200	613,200	4,230	
59	Portland				4	134	8	134.6	11.96	12.00	12.03	144.36	641,900	641,900	4,447	
60					4	134	0	135.0	11.83	12.03	12.05	144.96	649,700	649,700	4,482	
61					4	134	8	134.5	11.93	12.03	12.04	144.84	646,000	646,000	4,460	
62					4	134	0	135.0	11.83	12.02	12.06	144.96	570,000	601,000	4,146	
63	Hoffman	1	1	0	4	128	0	127.4	11.94	12.07	12.05	145.44	114,000	115,700	795	
64	Rosendale				4	125	8	126.6	11.80	12.06	12.04	145.20	101,800	110,000	758	
65					4	128	4	127.5	12.00	12.04	12.03	144.84	106,100	111,500	770	
66					4	127	8	128.3	11.84	12.04	12.05	145.08	110,000	110,000	758	
67					4	126	0	127.9	11.74	12.08	12.05	144.96	72,480	90,500	624	
68	Norton	1	1	0	4	126	8	125.9	11.99	12.02	12.05	144.84	88,000	96,900	669	
69	Rosendale				4	125	0	124.0	12.00	12.05	12.05	145.20	75,300	85,400	588	
70					4	125	8	125.6	11.92	12.04	12.03	144.84	76,300	95,800	661	
71					4	127	0	126.3	11.96	12.04	12.07	145.32	91,000	106,000	729	
72					4	124	8	124.1	11.99	12.01	12.04	144.60	62,000	82,100	568	
73	Alpha	1	*a* 1	0	4	135	0	136.5	11.81	12.02	12.04	144.72	798,000	810,200	5,598	
74	Portland				4	135	0	137.3	11.74	12.05	12.01	144.72	786,000	786,000	5,431	
75					4	135	8	137.9	11.80	12.02	11.97	143.88	770,600	770,600	5,356	
76					4	135	0	137.4	11.74	12.05	12.00	144.60	750,500	750,500	5,190	
77					4	134	8	137.3	11.69	12.05	12.02	144.84	718,000	718,000	4,957	
83	Alsen	1	1	3—¾" trap	4	145	0	145.3	11.87	12.06	12.05	145.32	265,000	265,000	1,824	
84	Portland				4	147	0	146.9	11.95	12.03	12.08	144.72	368,100	398,000	2,716	
85					4	147	0	147.3	11.83	12.10	12.05	145.80	399,800	399,800	2,742	
86					4	147	0	148.0	11.84	12.03	12.05	144.96	439,000	441,000	3,042	
87					4	146	0	148.0	11.74	12.09	12.01	145.20	431,000	471,000	3,244	
88					4	150	8	150.4	11.95	12.04	12.02	144.72	405,216	440,000	3,040	
89					4	151	0	152.5	11.99	11.85	12.04	142.67	593,000	593,000	4,156	Tested on edge.
90					4	150	0	151.5	12.06	11.77	12.06	141.83	518,000	549,000	3,871	Do.

91	Alpha	1	2	2—2½" trap ..	4	145	0	145.6	11.95	12.00	12.00	144.00	398,000	417,000	2,896	
92	Portland			½" trap ...	4	146	8	146.3	11.96	12.02	12.04	144.72	410,500	413,600	2,858	
93					4	145	0	146.1	11.88	12.03	12.00	144.36	430,500	430,500	2,982	
94					4	146	0	145.6	12.00	12.02	12.01	144.36	372,000	375,336	2,600	
95	Alpha	1	2	3—2½" trap ..	4	148	0	149.1	11.90	12.01	12.00	144.12	433,000	434,000	3,011	
96	Portland			½" .trap ..	4	148	0	147.6	11.93	12.07	12.03	145.20	348,480	348,480	2,400	
97					4	146	0	146.4	11.95	12.02	12.00	144.24	381,000	394,000	2,732	
98					4	147	8	148.6	11.89	12.00	12.02	144.24	405,000	405,000	2,808	
99					4	150	8	151.4	11.90	12.02	12.01	144.36	430,000	447,000	3,096	
100	Alpha	1	2	4—2½" trap ..	4	150	0	149.6	12.00	12.02	12.01	144.36	331,000	344,000	2,388	
101	Portland			½" trap ...	4	149	8	148.4	11.98	12.06	12.05	145.32	299,000	307,100	2,118	
102					4	147	8	148.4	11.86	12.05	12.02	144.84	260,000	324,600	2,241	
103					4	147	8	148.1	11.94	12.01	12.00	144.12	312,400	312,400	2,168	
104					4	150	8	150.4	11.98	12.02	12.01	144.36	388,500	388,500	2,345	
105	Alpha	1	2	5—2½" trap...	4	152	0	152.1	11.92	12.05	12.02	144.84	333,700	343,000	2,368	
106	Portland			½" trap....	4	149	0	148.9	11.98	12.01	12.02	144.36	346,464	367,000	2,542	
107					4	147	8	148.7	11.84	12.05	12.01	144.72	331,000	345,000	2,384	
108					4	150	0	150.3	11.88	12.02	12.08	145.20	334,000	355,000	2,445	
109					4	150	0	150.3	11.91	12.03	12.04	144.84	348,500	357,000	2,465	
110					4	146	0	(b)	12.08	12.02	12.01	144.36	242,000	248,600	1,722	
111	Alpha	1	2	6—2½" trap...	4	150	0	150.4	11.96	12.00	12.01	144.12	279,000	286,000	1,984	
112	Portland			½" trap....	4	151	0	150.2	11.99	12.01	12.06	144.84	326,000	340,000	2,347	
113					4	152	0	152.6	11.94	12.00	12.01	144.12	358,000	358,000	2,484	
114					4	152	0	152.0	11.95	12.01	12.04	144.60	358,000	373,800	2,585	
115					4	150	8	151.3	11.88	12.08	12.00	144.96	369,000	374,000	2,580	
116					4	152	0	151.6	11.98	12.02	12.03	144.60	372,000	373,500	2,583	
117					4	149	0	149.7	11.90	12.02	12.03	144.60	334,000	334,600	2,314	
118	Alpha	1	2	4—2½" trap....	4	153	0	152.7	11.99	12.02	12.01	144.36	276,000	387,000	1,988	Voids.
119	Portland				4	151	0	150.7	12.00	12.01	12.01	144.24	284,000	317,800	2,203	
120					4	147	8	147.9	11.98	11.99	12.00	143.88	297,000	313,000	2,175	Do.
121					4	153	0	151.9	12.01	12.05	12.03	144.96	318,912	338,300	2,334	Do.
122					4	150	0	150.1	11.95	12.03	12.01	144.48	304,000	316,500	2,191	Do.
123	Alpha	1	3	6—2½" trap....	4	144	0	145.1	11.86	12.03	12.02	144.60	208,000	210,000	1,452	Do.
124	Portland				4	148	0	146.6	12.01	12.07	12.03	145.20	241,000	242,000	1,667	Do.
125					4	143	0	142.8	11.98	12.02	12.02	144.48	204,000	209,000	1,447	Do.
126					4	146	8	146.1	11.98	12.02	12.03	144.60	219,000	238,300	1,648	Do.
127					4	150	0	150.6	11.88	12.03	12.04	144.84	260,712	279,900	1,932	Voids.
128					4	149	8	149.5	12.00	11.98	12.02	144.00	235,000	267,500	1,858	Tested on edge; voids.
129					4	150	4	148.1	12.07	12.07	12.03	145.20	203,000	247,100	1,702	Do.
130	Alpha	1	4	8—2½" trap....	4	141	0	141.8	11.86	12.05	12.02	144.84	128,000	140,400	969	Voids.
131	Portland				4	143	8	144.1	11.89	12.06	12.00	144.72	144,720	164,800	1,139	Do.
132					4	145	0	145.5	11.89	12.01	12.06	144.84	171,000	177,800	1,227	Do.
133					4	141	8	141.5	11.98	12.00	12.02	144.24	136,200	140,600	975	Do.
134					4	145	0	143.1	12.11	12.04	12.01	144.60	173,000	197,200	1,364	Do.

a Granite dust.

b Corner gone.

Compression Tests—Continued.

Marks.	Brand of cement.	Composition.			Age.	Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
		Cement.	Sand.	Broken stone.		Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
					Mos.	*Lbs.*	*Ozs.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
135	Alpha	1	5	10—2½" trap	4	142	8	141.6	12.04	12.03	12.01	144.48	99,000	116,000	803	Voids.
136	Portland				4	140	0	140.2	11.92	12.05	12.01	144.72	96,000	99,200	685	Do.
137					4	142	0	141.4	12.04	12.00	12.01	144.12	103,000	114,000	791	Do.
138					4	140	8	139.0	12.07	12.03	12.03	144.72	107,800	119,000	822	Do.
139					4	140	0	139.1	12.01	12.06	12.01	144.72	109,000	116,700	806	Do.
140					4	140	12	139.6	12.01	12.04	12.05	145.08	101,556	125,600	866	Do.
141	Alpha	1	6	12—2½" trap	4	137	8	135.9	12.10	12.03	12.01	144.48	89,000	97,300	673	Do.
142	Portland				4	134	8	133.9	12.06	11.97	12.02	143.88	71,000	90,400	628	Do.
143					4	132	8	132.1	11.98	12.03	12.03	144.72	79,800	83,100	574	Do.
144					4	142	12	142.0	12.03	12.02	12.02	144.48	112,000	115,700	801	Do.
145					4	144	4	143.9	11.95	12.01	12.07	144.96	135,600	141,300	975	Do.
146					4	143	8	143.3	11.99	12.00	12.03	144.86	117,200	122,000	845	Do.
147					4	137	0	136.4	12.01	12.02	12.02	144.48	95,000	97,100	672	Do.
148	Alpha	1	2	4—½" trap	4	141	4	142.2	11.88	12.04	12.00	144.48	276,000	276,000	1,910	
149	Portland				4	141	8	142.6	11.82	12.01	12.08	145.08	307,000	319,400	2,202	
150					4	143	0	141.8	11.97	12.04	12.01	144.60	363,000	363,000	2,510	
151					4	143	8	143.1	11.97	12.04	12.02	144.72	298,200	298,200	2,061	
152					4	142	8	143.8	11.88	12.01	12.00	144.12	358,000	358,000	2,484	
153					4	143	8	143.1	11.99	12.00	12.04	144.48	375,648	375,648	2,600	
160	Alpha	1	3	6—½" trap	4	140	8	140.6	11.98	12.00	12.01	144.12	227,200	227,200	1,580	
161	Portland				4	142	8	142.7	11.93	12.03	12.02	144.60	261,000	261,000	1,805	
162					4	143	0	142.9	11.97	12.01	12.03	144.48	292,000	292,000	2,021	
163					4	139	8	139.7	11.94	12.02	12.02	144.48	216,500	216,500	1,498	
164					4	139	8	140.0	11.89	12.01	12.06	144.84	213,600	213,600	1,475	
165					4	138	8	138.3	11.93	12.05	12.04	145.08	220,600	220,600	1,520	
166					4	140	0	140.9	11.91	12.01	12.00	144.12	282,000	282,000	1,610	
167					4	139	8	140.2	11.90	12.02	12.02	144.48	217,000	217,000	1,502	
176	Alpha	1	4	8—½" trap	4	135	0	136.0	11.85	12.06	12.00	144.72	170,200	170,200	1,176	
177	Portland				4	133	8	133.7	11.96	12.02	12.00	144.24	155,400	155,400	1,077	
178					4	132	4	132.9	11.92	12.02	12.00	144.24	132,400	132,400	918	
179					4	134	4	135.5	11.88	12.00	12.01	144.12	144,800	144,800	1,005	
180					4	136	0	135.2	12.00	12.00	12.04	144.48	137,000	137,000	948	

186	Alpha	1	5	10—½" trap	4	136	8	136.7	11.96	12.00	12.02	144.24	104,200	104,200	722
187	Portland				4	138	0	137.5	12.02	11.98	12.04	144.24	99,700	99,900	698
188					4	136	0	135.4	11.98	12.02	12.05	144.84	94,100	94,100	650
189					4	132	0	130.8	12.06	12.04	12.01	144.60	60,600	60,600	419
190					4	133	4	131.5	12.07	12.04	12.05	145.08	71,200	71,200	491
191					4	135	0	134.3	12.01	12.00	12.05	144.60	107,700	107,700	745
198	Alpha	1	6	12—½" trap	4	128	8	129.5	11.82	12.02	12.07	145.08	49,000	52,300	360
199	Portland				4	131	0	132.4	11.80	12.07	12.00	144.84	62,700	66,400	458
200					4	132	0	132.5	11.95	12.00	12.00	144.00	58,900	65,800	457
202					4	128	0	130.3	11.78	12.02	11.99	144.12	59,600	60,100	417
203					4	133	0	133.7	11.92	12.00	12.02	144.24	61,700	65,900	457
204					4	132	8	133.6	11.85	12.01	12.04	144.60	76,400	79,500	550
205					4	134	0	135.0	11.85	12.03	12.02	144.60	128,600	128,600	889
214	Alpha	1	2	2—½" trap	3	137	4	137.5	11.96	12.00	12.02	144.24	325,200	325,200	2,255
215	Portland				3	136	8	137.4	11.90	12.00	12.02	144.24	298,500	298,500	2,069
216					3	135	8	136.5	11.84	12.00	12.07	144.84	305,900	305,900	2,112
217					3	137	4	137.7	11.85	12.02	12.09	145.82	343,600	343,600	2,364
218	Alpha	1	2	3—½" trap	3	139	0	140.2	11.90	12.00	12.00	144.00	298,500	298,500	2,078
219	Portland				3	140	12	141.6	11.89	12.02	12.02	144.48	314,000	314,000	2,173
220					3	142	0	141.6	12.00	12.03	12.00	144.36	317,400	317,400	2,199
221					3	142	8	141.9	12.05	12.00	12.00	144.00	309,000	309,000	2,146
222					3	142	8	143.5	11.92	12.00	12.00	144.00	309,900	309,900	2,152
223	Alpha	1	2	5—½" trap	3	145	0	146.2	11.90	12.02	11.98	144.00	309,800	309,800	2,151
224	Portland				3	144	12	145.9	11.89	12.00	12.01	144.12	291,500	291,500	2,023
225					3	144	0	145.5	11.88	12.02	11.98	144.00	319,000	323,600	2,247
226					3	144	8	145.2	11.89	12.01	12.04	144.60	326,000	326,000	2,254
227					3	144	8	145.1	11.92	12.00	12.03	144.36	293,000	293,000	2,030
228					3	139	0	140.5	11.88	12.00	11.99	143.88	263,000	263,000	1,828
229	Alpha	1	2	6—½" trap	3	141	0	140.6	11.98	12.02	12.03	144.60	212,000	212,000	1,466
230	Portland				3	145	0	145.5	11.96	12.00	12.00	144.00	310,000	318,000	2,208
231					3	139	0	139.7	11.87	12.05	12.02	144.84	231,000	231,000	1,595
232					3	141	4	141.3	11.96	12.03	12.01	144.48	236,700	236,700	1,638
233					3	139	4	139.0	11.97	12.00	12.05	144.60	199,600	199,600	1,380
234					3	143	0	142.6	11.99	12.00	12.05	144.60	204,500	204,500	1,414
235					3	143	0	142.9	12.00	12.03	11.98	144.12	267,100	267,100	1,858
236	Alpha	1	2	7—½" trap	3	142	4	142.1	11.95	12.06	12.00	144.72	254,000	254,000	1,755
237	Portland				3	139	8	138.6	11.98	12.08	12.02	145.20	233,000	233,000	1,605
238					3	136	0	136.6	11.85	12.04	12.06	145.20	205,500	205,500	1,415
239					3	133	8	135.2	11.84	12.01	12.00	144.12	179,200	179,200	1,243
240					3	135	4	136.6	11.84	12.04	12.00	144.48	190,100	190,100	1,316
241					3	133	8	132.9	12.04	11.98	12.03	144.12	161,000	161,000	1,117
242					3	132	0	131.1	12.03	12.05	12.00	144.60	145,800	145,800	1,008
243					3	132	8	132.5	11.98	12.03	11.99	144.24	141,800	141,800	983

COMPRESSION TESTS—Continued.

Marks.	Brand of Cement.	Composition: Cement.	Sand.	Broken stone.	Age.	Weight: Total.		Weight: Per cubic foot.	Dimensions: Height.	Dimensions: Compressed surface.		Sectional area.	First crack.	Ultimate strength: Total.	Ultimate strength: Per square inch.	Remarks.
					Mos.	*Lbs.*	*Ozs.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
244	Alpha	1	2	8—½" trap	3	132	0	132.9	11.90	12.00	12.02	144.24	128,200	128,200	889	
245	Portland				3	134	8	133.2	12.04	12.03	12.05	144.96	153,000	153,000	1,055	
246					3	140	0	138.2	12.14	12.01	12.01	144.24	160,600	160,600	1,113	
247					3	136	0	136.1	11.92	12.04	12.03	144.84	177,800	177,800	1,228	
248					3	134	8	135.2	11.91	12.02	12.01	144.36	123,000	123,000	852	
249	Alpha	1	2	8—½" trap	3	136	4	135.8	12.00	12.01	12.03	144.48	184,100	184,100	1,274	
250	Portland				3	135	12	134.6	12.07	12.02	12.01	144.36	179,300	179,300	1,242	
251					3	133	8	132.4	12.02	12.05	12.03	144.96	112,800	112,800	778	
252					3	131	8	130.7	11.98	12.07	12.02	145.08	130,572	130,572	900	
253					3	133	0	132.7	11.95	12.08	12.00	144.96	137,500	137,500	949	
254	Alpha	1	2	9—½" trap	3	126	12	126.9	11.93	12.06	12.00	144.72	94,400	94,400	652	
255	Portland				3	129	0	129.2	11.98	12.00	12.00	144.00	120,200	120,200	835	
256					3	129	8	129.2	12.01	12.02	12.00	144.24	116,300	116,300	806	
257					3	129	8	128.4	12.01	12.01	12.08	145.08	109,700	109,700	756	
258					3	130	0	130.4	11.95	12.01	12.00	144.12	118,100	118,100	819	
259	Alpha	1	2	9—½" trap	3	132	0	133.0	11.90	12.00	12.01	144.12	126,500	126,500	878	
260	Portland				3	137	0	136.8	11.95	12.01	12.06	144.84	144,300	144,300	996	
261					3	133	4	133.7	11.98	12.02	12.01	144.36	104,700	104,700	725	
262					3	133	0	131.8	12.04	12.04	12.03	144.84	129,900	129,900	897	
263					3	133	8	133.1	12.02	12.00	12.02	144.24	115,200	115,200	799	
264	Alpha	1	2	2—1½" trap	3	139	0	140.5	11.85	12.01	12.01	144.24	263,000	263,000	1,823	
265	Portland				3	137	4	138.0	11.85	12.08	12.01	145.08	267,400	267,400	1,843	
266					3	141	4	142.1	11.91	12.00	12.02	144.24	258,500	258,500	1,792	
267					3	139	8	140.7	11.87	12.01	12.02	144.36	229,000	233,100	1,615	
268	Alpha	1	2	3—1½" trap	3	142	8	143.5	11.93	12.00	11.99	143.88	289,200	289,200	2,010	
269	Portland				3	142	8	143.0	11.93	12.01	12.02	144.36	248,300	248,300	1,720	
270					3	145	4	145.6	11.87	12.03	12.07	145.20	269,600	269,600	1,857	
271					3	147	0	147.2	11.98	12.00	12.00	144.00	282,200	282,200	1,960	
272					3	146	8	146.9	11.93	12.00	12.04	144.48	290,200	290,200	2,009	

273	Alpha	1	2	4—1½" trap...	3	150	8	151.8	11.87	12.02	12.01	144.36	292,000	852,000	2,438	
274	Portland				3	149	8	151.1	11.84	12.03	12.00	144.36	288,720	317,500	2,199	
275					3	146	8	147.7	11.85	12.02	12.03	144.60	280,800	281,600	1,947	
276					3	144	0	145.8	11.78	12.05	12.02	144.84	278,000	284,000	1,961	
277					3	149	0	149.0	11.90	12.02	12.08	145.20	316,000	323,800	2,230	
278	Alpha	1	2	5—1½" trap...	3	152	0	152.0	11.91	12.03	12.06	145.08	391,100	391,100	2,696	
279	Portland				3	153	0	153.0	12.00	11.99	12.01	144.00	388,000	388,000	2,694	
280					3	151	8	150.9	12.01	12.02	12.02	144.48	329,000	339,200	2,348	
281					3	149	8	149.7	11.88	12.02	12.03	145.20	330,000	346,400	2,386	
282					3	149	0	149.7	11.86	12.03	12.05	144.96	325,000	343,100	2,367	
283					3	149	8	150.0	11.92	12.02	12.02	144.48	313,000	321,000	2,222	
284	Alpha	1	2	6—1½" trap...	3	141	8	.....	11.98	12.04	12.03	144.84	218,000	221,500	1,516	Voids.
285	Portland				3	151	8	150.0	12.03	12.02	12.07	145.08	323,000	351,000	2,419	
286					3	156	0	154.3	12.05	12.06	12.02	144.96	318,000	368,000	2,539	
287					3	154	0	152.6	12.08	12.02	12.01	144.36	302,000	328,000	2,272	
288					3	150	0	151.6	11.84	12.00	12.03	144.36	288,000	317,000	2,196	
289					3	148	0	147.3	12.01	12.02	12.03	144.60	236,000	261,000	1,805	
290	Alpha	1	2	7—1½" trap...	3	149	8	147.9	12.06	12.04	12.03	144.84	287,000	319,000	2,202	
291	Portland				3	149	0	147.8	12.07	12.01	12.02	144.36	261,000	295,000	2,043	
292					3	147	0	147.4	11.97	12.02	11.98	144.00	253,000	255,000	1,771	
293					3	144	8	143.2	12.03	12.03	12.05	144.96	189,900	189,900	1,310	
294					3	147	8	146.0	12.08	12.01	12.03	144.48	206,000	206,000	1,426	
295					3	149	0	148.7	11.99	12.01	12.02	144.36	178,282	221,500	1,534	
296					3	145	0	143.6	12.04	12.05	12.03	144.96	175,000	183,300	1,264	
297	Alpha	1	2	8—1½" trap...	3	144	8	143.4	12.06	12.01	12.02	144.36	254,000	254,000	1,759	
298	Portland				3	144	0	141.7	12.07	12.08	12.04	145.44	162,000	191,500	1,317	
299					3	146	0	146.0	11.93	12.06	12.01	144.84	198,000	216,000	1,491	
300					3	137	8	136.8	12.09	11.96	12.02	143.64	129,000	130,300	907	
301	Alpha	1	2	8—1½" trap...	3	144	0	141.7	12.06	12.06	12.07	145.56	160,116	161,400	1,109	
302	Portland				3	147	0	146.3	12.02	12.02	12.02	144.48	204,200	204,200	1,413	
303					3	143	8	142.5	12.00	12.03	12.05	144.96	210,000	218,400	1,472	
304					3	140	8	139.2	12.10	12.01	12.00	144.12	171,000	171,000	1,186	
402	Alpha	1	2	4—2½" trap...	3	151	0	152.1	11.85	12.04	12.02	144.72	281,000	318,384	2,200	
403	Portland				3	149	0	148.8	11.93	12.05	12.04	145.08	262,000	282,500	1,947	
404					3	149	8	149.8	11.89	12.06	12.03	145.08	259,900	262,300	1,808	
405					3	149	12	148.1	12.01	12.03	12.01	144.48	216,000	221,800	1,535	
406					3	147	0	146.5	12.01	12.01	12.02	144.36	182,000	189,000	1,309	
407	Steel	1	2	4—2½" trap...	3	151	8	153.0	11.88	11.99	12.01	144.00	227,000	283,300	1,971	
408	Portland				3	152	0	152.8	11.89	12.02	12.03	144.60	237,000	289,900	2,005	
409					3	151	0	151.1	11.88	12.03	12.03	145.32	245,000	275,400	1,895	
410					3	152	8	152.1	11.90	12.02	12.03	144.60	261,000	301,300	2,087	
411					3	153	8	151.6	12.02	12.03	12.02	144.60	231,360	251,000	1,736	

COMPRESSION TESTS—Continued.

Marks.	Brand of cement.	Composition.			Age.	Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
		Cement.	Sand.	Broken stone.		Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
					Mos.	*Lbs.*	*Ozs.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
427	Norton	1	2	4—2½" trap	3	150	0	149.5	12.00	12.01	12.03	144.48	28,200	66,500	460	
428	Rosendale				3	145	8	145.4	11.92	12.08	12.06	145.08	19,000	41,200	284	
429					3	147	0	145.3	12.06	12.03	12.05	144.96	19,500	38,100	263	
430					3	145	8	145.1	11.98	12.02	12.03	144.60	18,500	38,300	265	
431					3	146	0	145.9	11.98	12.01	12.02	144.36	28,872	56,200	389	
432	Norton	1	2	0	3	120	0	120.6	11.85	12.04	12.05	145.08	31,400	36,100	249	
433	Rosendale				3	120	8	119.9	11.99	12.03	12.04	144.84	26,500	33,600	232	
434					3	120	0	121.0	11.82	12.05	12.08	144.96	31,400	39,400	272	
435					3	121	0	122.0	11.81	12.06	12.08	145.08	33,200	42,200	291	
436					3	119	0	120.0	11.81	12.05	12.04	145.08	45,300	49,500	341	
442	Alpha	1	2	4—1¼" to 3" pebbles	3	150	0	148.5	12.06	12.04	12.02	144.72	352,000	459,900	3,178	
443	Portland				3	150	8	148.8	12.05	12.05	12.04	145.08	298,000	445,100	3,068	
444					3	148	8	148.1	11.95	12.04	12.04	144.96	398,000	481,000	3,318	
445					3	148	0	147.6	11.97	12.02	12.04	144.72	440,000	472,500	3,265	
446					3	147	8	145.9	12.07	12.04	12.02	144.72	440,000	463,104	3,200	
452	Alpha	1	2	4—1¼" to 2½" broken brick	3	129	8	130.9	11.81	12.05	12.01	144.72	334,000	417,000	2,881	
453	Portland				3	131	8	131.2	11.98	12.03	12.02	144.60	379,000	399,900	2,766	
454					3	131	0	131.3	11.95	12.02	12.00	144.24	378,000	399,800	2,772	
455					3	131	0	130.8	11.94	12.03	12.05	144.96	382,000	432,000	2,980	
456					3	130	8	130.3	11.93	12.05	12.04	145.08	319,176	360,500	2,485	
462	Alpha	1	3	6—1¼" to 2½" broken brick	3	131	4	130.5	11.98	12.05	12.04	145.08	242,000	288,000	1,985	
463	Portland				3	131	0	129.8	11.99	12.07	12.02	145.08	284,000	309,000	2,130	
464					3	129	8	129.5	11.90	12.05	12.05	145.20	305,000	332,400	2,289	
465					3	131	0	131.7	11.86	12.04	12.04	144.96	317,000	350,200	2,416	
466					3	129	8	128.9	11.95	12.05	12.06	145.32	321,000	348,768	2,400	
467					3	130	0	130.0	11.93	12.02	12.05	144.84	235,000	295,400	2,039	
468					3	132	0	133.1	11.87	12.01	12.02	144.36	258,000	316,000	2,189	
480	Alpha	1	a1	0	3	134	0	136.1	11.73	12.04	12.05	145.08	810,000	b810,000	5,583	
481	Portland				3	136	8	136.7	11.90	12.02	12.06	144.96	690,000	739,000	5,098	
482					3	135	0	135.8	11.82	12.05	12.06	145.32	576,000	810,000	5,574	
483					3	137	0	136.9	11.90	12.05	12.06	145.32	755,664	810,000	5,574	

484	Alpha	1	a 2	0	3	135	0	133.9	12.00	12.05	12.05	145.20	564,500	564,500	3,888
485	Portland				3	135	0	134.1	11.94	12.08	12.06	145.68	650,500	650,500	4,465
486					3	134	8	133.9	11.96	12.03	12.06	145.08	616,000	616,000	4,246
487	Alpha	1	a 3	0	3	128	4	129.3	11.82	12.04	12.04	144.96	386,000	386,000	2,668
488	Portland				3	127	8	127.5	11.90	12.03	12.07	145.20	354,000	358,500	2,469
489					3	128	8	127.6	11.98	12.06	12.04	145.20	365,000	365,000	2,514
490					3	126	0	125.0	12.02	12.06	12.02	144.96	312,800	312,800	2,158
491	Alpha	1	a 2	4—2¼" trap	3	152	0	152.4	11.89	12.05	12.08	144.96	316,000	420,200	2,899
492	Portland				3	152	0	150.5	11.99	12.05	12.08	145.56	429,000	499,600	3,432
493					3	156	0	154.5	12.10	12.00	12.02	144.24	453,000	472,600	3,276
494					3	156	0	154.2	12.02	12.06	12.06	145.44	292,000	401,400	2,760
495					3	153	0	154.0	11.79	12.05	12.08	145.56	308,000	378,500	2,600

a Granite dust.

b Load of 810,000 pounds applied and released ten times without rupture of the cube. The cube was then subjected to a concentrated load on one face over a section 8".25 ×8.00=66 square inches. Ultimate strength, 499,500 pounds=7,568 pounds per square inch on reduced section, and 3,448 pounds per square inch on full section of cube.

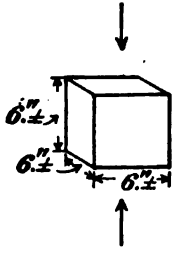
MEAN COMPRESSIVE STRENGTH OF CONCRETE AND MORTAR CUBES.

12-INCH CUBES.

Brand of cement.	Age.	Composition.			Mean strength per square inch.
		Cement.	Sand.	Broken stone.	
	Mos.				*Pounds.*
Alpha Portland	3	1	2	2—¼″ trap	2,200
		1	2	3—¼″ trap	2,149
		1	2	5—¼″ trap	2,089
		1	2	6—¼″ trap	1,651
		1	2	7—¼″ trap	1,305
		1	2	8—¼″ trap	1,028
		1	2	9—¼″ trap	816
Alpha Portland	3	1	2	2—1¼″ trap	1,768
		1	2	3—1¼″ trap	1,911
		1	2	4—1¼″ trap	2,155
		1	2	5—1¼″ trap	2,452
		1	2	6—1¼″ trap	2,124
		1	2	7—1¼″ trap	1,660
		1	2	8—1¼″ trap	1,332
Alpha Portland	3	1	2	4—2½″ trap	1,760
Alpha Portland	3	1	2	4—1½″ to ⅝″ pebbles	3,206
Alpha Portland	3	1	2	4—1½″ to 2½″ broken brick	2,777
Alpha Portland	3	1	3	6—1½″ to 2½″ broken brick	2,207
Alpha Portland	3	1	*a* 1	0	5,457
	3	1	*a* 2	0	4,199
	3	1	*a* 3	0	2,451
Alpha Portland	3	1	*a* 2	4—2½″ trap	2,993
Steel Portland	3	1	2	4—2½″ trap	1,939
Norton's Rosendale	3	1	2	0	277
	3	1	2	4—2½″ trap	332
Alpha Portland	4	1	1	0	4,371
	4	1	2	0	2,506
	4	1	3	0	1,812
	4	1	4	0	829
	4	1	5	0	484
	4	1	6	0	185
	4	1	7	0	118
Atlas Portland	4	1	1	0	5,570
Star Portland	4	1	1	0	5,045
Steel Portland	4	1	1	0	1,743
Saylor's Portland	4	1	1	0	3,979
Germania Portland	4	1	1	0	4,353
Hoffman's Rosendale	4	1	1	0	741
Norton's Rosendale	4	1	1	0	643
Alpha Portland	4	1	*a* 1		5,306
Alpha Portland	4	1	2	2—2½″ trap + ¼″ trap	2,834
	4	1	2	3—¼″ trap	2,809
	4	1	2	4—2½″ trap	2,250
	4	1	2	5—¼″ trap	2,441
	4	1	2	6—	2,411
Alpha Portland	4	1	2	4—2½″ trap	2,178
		1	3	6—2½″ trap	1,672
		1	4	8—2½″ trap	1,185
		1	5	10—2½″ trap	796
		1	6	12—2½″ trap	738
Alpha Portland	4	1	2	4—¼″ trap	2,294
		1	3	6—¼″ trap	1,626
		1	4	8—¼″ trap	1,025
		1	5	10—¼″ trap	620
		1	6	12—¼″ trap	513
Alsen's Portland	4	1	1	3—¼″ trap	3,079

a Granite dust.

EXPERIMENTS ON RETARDED SET OF CEMENT MORTAR.



FIRST SERIES.

Marks.	Brand of cement.	Composition.			Age.	Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
		Cement.	Sand.	Broken stone.		Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
					Days.	*Lbs.*	*Oz.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	
10	Alpha	1	2	0	70	16	14½	130.0	6.16	6.02	6.06	36.48	67,900	67,900	1,861	Time from mixing and filling the first mold (cube 10) until the last mold was filled (cube 27) one hour.
11	Portland					16	10	128.7	6.15	6.02	6.03	36.30	57,300	57,300	1,578	
12						16	9½	129.9	6.08	6.00	6.05	36.30	54,900	54,900	1,512	
13						16	11	131.5	6.08	6.00	6.01	36.06	67,400	67,400	1,869	
14						16	9½	129.0	6.12	6.06	5.99	36.30	57,600	57,600	1,587	
15						16	10½	129.4	6.15	6.05	5.98	36.18	55,380	55,380	1,531	
16						16	6	127.2	6.13	6.05	6.00	36.30	54,700	54,700	1,507	
17						16	7	128.3	6.06	6.08	6.01	36.54	59,600	59,600	1,631	
18						16	4	127.6	6.07	6.04	6.00	36.24	56,050	56,050	1,547	
19						16	8	129.0	6.12	6.00	6.02	36.12	58,480	58,480	1,619	
20						16	15	129.4	6.15	6.06	6.07	36.78	62,300	62,300	1,694	
21						16	12	127.3	6.19	6.06	6.06	36.72	54,400	54,400	1,481	
22						16	8	128.1	6.07	6.07	6.04	36.66	58,700	58,700	1,601	
23						16	7	128.3	6.08	6.05	6.02	36.42	50,200	50,200	1,378	
24						16	6	128.4	6.07	6.04	6.01	36.30	53,800	53,800	1,482	
25						16	7½	128.7	6.07	6.05	6.02	36.42	56,500	56,500	1,551	
26						16	7½	127.0	6.10	6.04	6.08	36.72	49,900	49,900	1,359	
27						16	8½	128.8	6.05	6.06	6.05	36.66	49,400	49,400	1,347	

EXPERIMENTS ON RETARDED SET OF CEMENT MORTAR—Continued.

SECOND SERIES.

[Molds 28, 29, and 30 were filled immediately after mixing the mortar.]

Marks.	Brand of cement.	Composition.			Age.	Weight.			Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
		Cement.	Sand.	Broken stone.		Total.		Per cubic foot.	Height.	Compressed surface.				Total.	Per square inch.	
					Days.	*Lbs.*	*Oz.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*	Molds filled at—
28	Alpha	1	2	0	62	16	7½	131.7	6.00	6.05	5.95	36.00	94,800	94,800	2,633	
29	Portland					16	11	131.1	6.04	6.00	6.07	36.42	96,200	96,200	2,641	9.30 a. m.
30						16	9½	131.6	6.01	6.04	6.00	36.24	107,800	107,800	2,975	
31						16	11	132.2	6.02	5.99	6.05	36.24	103,700	103,700	2,861	
32						16	12½	132.2	6.04	6.05	6.00	36.30	94,000	95,100	2,620	10.30 a. m.
33						16	10½	131.5	6.04	6.05	5.99	36.24	100,200	100,200	2,765	
34						16	13½	132.7	6.05	6.04	6.00	36.24	93,100	93,500	2,580	
35						17	0	133.1	6.10	6.00	6.03	36.18	97,900	98,300	2,717	11.30 a. m.
36						17	½	132.4	6.11	6.00	6.06	36.36	97,600	97,600	2,684	
37						17	½	132.4	6.13	6.00	6.04	36.24	90,400	90,400	2,494	
38						17	1½	132.8	6.13	6.00	6.05	36.30	96,100	96,100	2,647	12.30 p. m.
39						17	1½	132.3	6.15	6.05	6.00	36.30	93,100	93,100	2,565	
40						17	½	133.3	6.09	6.00	6.04	36.24	85,200	85,200	2,351	
41						16	8½	129.8	6.07	6.04	6.00	36.24	86,600	86,600	2,390	1.30 p. m.
42						16	15	133.9	6.07	6.00	6.00	36.00	92,100	92,100	2,558	
43						16	12	131.4	6.10	6.00	6.02	36.12	81,400	81,400	2,253	
44						16	12	130.7	6.06	6.07	6.02	36.54	81,700	81,700	2,236	2.30 p. m.
45						16	10½	130.7	6.04	6.06	6.02	36.48	87,000	87,000	2,385	
46						16	7½	128.7	6.07	6.06	6.01	36.42	90,800	90,800	2,469	
47						16	9½	129.7	6.06	6.07	6.01	36.48	81,700	81,700	2,240	
48						16	10	130.8	6.07	6.03	6.00	36.18	77,300	77,300	2,136	2.45 p. m.
49						17	1	133.3	6.06	6.00	6.08	36.48	84,900	84,900	2,327	
50						16	7	130.0	6.01	6.06	6.00	36.36	75,400	75,400	2,074	
51						16	10½	130.0	6.01	6.05	5.99	36.24	80,600	80,600	2,224	

From the time of mixing until put into the molds the mortar was occasionally stirred and some water added to keep the mortar at a uniform consistenccy.

Size of specimens, 12-inch cubes.
Gauged length, 5″.

Marks.	Brand of cement.	Composition.			Age.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.	Broken stone.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Mos.	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
2	Alpha Portland	1	1	0	4	3,571,000	3,750,000	3,125,000	.0001	.0002	.0001	3,889
10	.....do	1	2	0	4	3,125,000	2,647,000	2,381,000	0.	.0001	0.	2,411
12	.....do	1	3	0	4	1,786,000	1,452,000	.....	.0008	.0009	.....	1,783
19	.....do	1	5	0	4	.....	.....	.....	.....	.....	.....	566
30	.....do	1	6	0	4	.....	.....	.....	.....	.....	.....	228
35	.....do	1	7	0	4	.....	.....	.....	.....	.....	.....	147
39	Atlas Portland	1	1	0	4	6,250,000	4,500,000	3,846,000	0.	0.	.0001	5,672
43	Star Portland	1	1	0	4	4,167,000	3,750,000	3,333,000	0.	0.	.0001	5,471
52	Steel Portland	1	1	0	4	1,190,000	1,098,000	.....	.0009	.0028	.....	1,800
57	Saylor's Portland	1	1	0	4	3,125,000	3,000,000	2,500,000	.0001	.0002	.0005	3,945
62	Germania Portland	1	1	0	4	2,500,000	2,647,000	2,500,000	0.	.0002	.0006	4,146
67	Hoffman's Rosendale	1	1	0	4	.....	.....	.....	.....	.....	.....	624
72	Norton's Rosendale	1	1	0	4	.....	.....	.....	.....	.....	.....	568
76	Alpha Portland	1	a1	0	4	3,571,000	3,750,000	2,381,000	.0001	.0001	.0002	5,190
88	Alsen's Portland	1	1	3— ¼″ trap	4	2,500,000	2,812,000	1,562,000	.0001	.0006	.0028	3,040
94	Alpha Portland	1	2	2—2¼″ and ¼″ trap	4	3,125,000	2,812,000	1,562,000	.0003	.0006	.0028	2,600
96	.....do	1	2	3—2¼″ and ¼″ trap	4	3,125,000	2,812,000	1,250,000	.0002	.0004	.0038	2,400
102	.....do	1	2	4—2¼″ and ¼″ trap	4	2,500,000	2,250,000	.....	.0004	.0009	.....	2,241
106	.....do	1	2	5—2¼″ and ¼″ trap	4	3,571,000	2,500,000	1,136,000	.0001	.0008	.0046	2,542
117	.....do	1	2	6—2¼″ and ¼″ trap	4	3,125,000	3,000,000	1,316,000	.0001	.0008	.0052	2,314
121	.....do	1	2	4—2¼″ trap	4	2,778,000	1,389,000	1,250,000	.0003	.0009	.0081	2,334
127	.....do	1	3	6—2¼″ trap	4	3,125,000	2,368,000	.....	.0001	.0006	.....	1,932
131	.....do	1	4	8—2¼″ trap	4	1,562,000	.....	.....	.0022	.....	.....	1,139
140	.....do	1	5	10—2¼″ trap	4	862,000	.....	.....	.....	.....	.....	866
144	.....do	1	6	12—2¼″ trap	4	1,190,000	.....	.....	.0052	.....	.....	801
153	.....do	1	2	4— ¼″ trap	4	2,778,000	2,647,000	1,429,000	.0001	.0003	.0017	2,600
167	.....do	1	3	6— ¼″ trap	4	2,273,000	1,800,000	.....	.0002	.0009	.....	1,502
180	.....do	1	4	8— ¼″ trap	4	2,083,000	.....	.....	.0001	.....	.....	948
191	.....do	1	5	10— ¼″ trap	4	862,000	.....	.....	.0097	.....	.....	745
205	.....do	1	6	12— ¼″ trap	4	1,667,000	.....	.....	.0010	.....	.....	889
217	.....do	1	2	2— ¼″ trap	3	2,778,000	2,647,000	1,613,000	0.	.0002	.0017	2,364
222	.....do	1	2	8— ¼″ trap	3	3,125,000	2,647,000	909,000	.0001	.0008	.0119	2,152

a Granite dust.

THE ELASTIC PROPERTIES OF CONCRETE AND MORTAR—Continued.

Marks.	Brand of cement.	Composition.			Age.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.	Broken stone.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Mos.	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
228	.....do	1	2	5— ¼" trap	3	2,278,000	2,045,000	.....	.0001	.0008	.....	1,828
235	.....do	1	2	6— ¼" trap	3	2,083,000	1,667,000	.....	.0002	.0010	.....	1,858
243	.....do	1	2	7— ¼" trap	3	1,389,000	.....	.....	.0013	.....	.....	983
252	.....do	1	2	8— ¼" trap	3	1,316,000	.....	.....	.0011	.....	.....	900
263	.....do	1	2	9— ¼" trap	3	862,000	.....	.....	.0042	.....	.....	799
264	.....do	1	2	2—1½" trap	3	2,778,000	2,812,000	.....	.0001	.0004	.....	1,823
272	.....do	1	2	3—1½" trap	3	2,778,000	2,500,000	.....	.0003	.0012	.....	2,009
274	.....do	1	2	4—1½" trap	3	2,778,000	2,368,000	.....	.0004	.0010	.....	2,199
278	.....do	1	2	5—1½" trap	3	2,273,000	2,368,000	1,250,000	.0002	.0007	.0052	2,696
286	.....do	1	2	6—1½" trap	3	2,273,000	1,800,000	1,429,000	.0007	.0017	.0096	2,589
295	.....do	1	2	7—1½" trap	3	1,389,000	1,023,000	.....	.....	.0018	.0089	1,534
301	.....do	1	2	8—1½" trap	3	1,562,000	978,000	.....	.0018	.0094	.....	1,109
402	.....do	1	2	4—2½" trap	3	2,778,000	2,250,000	.....	.0005	.0016	.....	2,200
411	Steel Portland	1	2	4—2½" trap	3	2,500,000	2,500,000	.....	.0005	.0030	.....	1,736
431	Norton's Rosendale	1	2	4—2½" trap	3	.....	.....	.....	.....	.....	.....	389
435	.....do	1	2	0	3	.....	.....	.....	.....	.....	.....	291
446	Alpha Portland	1	2	4—1½" to ⅜" pebbles	3	3,125,000	3,461,000	3,333,000	.0001	.0003	.0007	3,200
456	.....do	1	2	4—1½" to 2½" broken brick.	3	2,500,000	2,368,000	1,020,000	.0002	.0005	.0033	2,485
466	.....do	1	3	6—1½" to 2½" broken brick.	3	2,273,000	2,143,000	1,250,000	0.	.0003	.0033	2,400
488	.....do	1	a1	0	3	3,571,000	3,750,000	5,000,000	.0001	0.	.0002	5,574
485	.....do	1	a2	0	3	3,571,000	4,091,000	3,846,000	.0001	.0001	.0003	4,465
489	.....do	1	a3	0	3	2,778,000	2,500,000	1,562,000	.0002	.0002	.0015	2,514
494	.....do	1	a2	4—2½" trap	3	2,500,000	2,045,000	1,351,000	.0003	.0011	.0087	2,760

a Granite dust.

Marks, 2.
Composition: Alpha Portland cement, 1; sand, 1.
Water used in mortar, 23.20 per cent of cement.
Age, 4 months.
Weight per cubic foot, 135.8 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0003	0.	
58,128	400	.0005	.0001	
87,192	600	.0008	.0001	E=3,571,000 pounds per square inch.
116,256	800	.0011	.0001	
145,320	1,000	.0014	.0002	E=3,750,000 pounds per square inch.
174,384	1,200	.0018	.0002	
203,448	1,400	.0021	.0002	
232,512	1,600	.0025	.0002	E=3,125,000 pounds per square inch.
261,576	1,800	.0027	.0001	
290,640	2,000	.0029	.0001	
319,704	2,200	.0031	.0001	
348,768	2,400	.0033	.0001	
377,832	2,600	.0035	.0001	
406,896	2,800	.0036	.0001	
435,960	3,000	.0038	.0001	
465,024	3,200	.0040	0.	
494,088	3,400	.0043	—.0001	
523,152	3,600	.0046	—.0005	
552,216	3,800	.0050	—.0012	
558,000	3,839	.....	.....	Ultimate strength.

Marks, 10.
Composition: Alpha Portland cement, 1; sand, 2.
Water used in mortar, 27.64 per cent of cement.
Age, 4 months.
Weight per cubic foot, 134.1 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,556	100	0.	0.	Initial load.
29,112	200	.0001	0.	
43,668	300	.0003	0.	
58,224	400	.0005	0.	
72,780	500	.0006	0.	
87,336	600	.0008	0.	E=3,125,000 pounds per square inch.
101,892	700	.0010	0.	
116,448	800	.0012	0.	
131,004	900	.0015	0.	
145,560	1,000	.0018	.0001	E=2,647,000 pounds per square inch.
174,672	1,200	.0023	.0001	
203,784	1,400	.0028	.0001	
232,896	1,600	.0032	.0001	E=2,381,000 pounds per square inch.
262,008	1,800	.0035	.0001	
291,120	2,000	.0038	0.	
320,232	2,200	.0040	— .0002	
349,344	2,400	.0050	— .0013	
351,000	2,411	.....	.....	Ultimate strength.

Marks, 12.
Composition: Alpha Portland cement, 1; sand, 3.
Water used in mortar, 37.07 per cent of cement.
Age, 4 months.
Weight per cubic foot, 133.9 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0002	0.	
43,488	300	.0006	0.	
57,984	400	.0010	.0001	
72,480	500	.0013	.0002	
86,976	600	.0017	.0003	E=1,786,000 pounds per square inch.
101,472	700	.0022	.0005	
115,968	800	.0027	.0006	
130,464	900	.0033	.0007	
144,960	1,000	.0040	.0009	E=1,452,000 pounds per square inch.
173,952	1,200	.0055	.0013	
202,944	1,400	.0081	.0021	
231,936	1,600	.0117	.0038	
258,500	1,783	.....	.....	Ultimate strength.

Marks, 19.
Composition: Alpha Portland cement, 1; sand, 5.
Water used in mortar, 64.81 per cent of cement.
Age, 4 months.
Weight per cubic foot, 118.6 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0008	.0008	
43,488	300	.0017	.0006	
57,984	400	.0030	.0011	
72,480	500	.0063	.0033	
82,100	566	.....	.....	Ultimate strength.

Marks, 30.
Composition: Alpha Portland cement, 1; sand, 6.
Water used in mortar, 60.78 per cent of cement.
Age, 4 months.
Weight per cubic foot, 118 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
21,744	150	.0008	.0004	
28,992	200	.0022	.0011	
33,100	228	.0040	.....	Ultimate strength.

Marks, 35.
Composition: Alpha Portland cement, 1; sand, 7.
Water used in mortar, 66.84 per cent of cement.
Age, 4 months.
Weight per cubic foot, 111.6 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
7,230	50	—.0007	.....	
14,460	100	0.	.....	
21,200	147	.0120	.....	Ultimate strength.

Marks, 39.
Composition: Atlas Portland cement, 1; sand, 1.
Water used in mortar, 28.57 per cent of cement.
Age, 4 months.
Weight per cubic foot, 142.0 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	0.	0.	
58,080	400	.0001	0.	
87,120	600	.0004	0.	E=6,250,000 pounds per square inch.
116,160	800	.0006	0.	
145,200	1,000	.0010	0.	E=4,500,000 pounds per square inch.
174,240	1,200	.0012	0.	
203,280	1,400	.0014	0.	
232,320	1,600	.0017	.0001	E=3,846,000 pounds per square inch.
261,360	1,800	.0021	.0001	
290,400	2,000	.0024	.0001	
319,440	2,200	.0028	.0002	
348,480	2,400	.0031	.0003	
377,520	2,600	.0034	.0003	
406,560	2,800	.0037	.0004	
435,600	3,000	.0040	.0004	
464,640	3,200	.0042	.0005	
493,680	3,400	.0045	.0005	
522,720	3,600	.0048	.0006	
551,760	3,800	.0051	.0006	
580,800	4,000	.0053	.0007	
609,840	4,200	.0057	.0007	
638,880	4,400	.0060	.0007	
667,920	4,600	.0063	.0007	
696,960	4,800	.0067	.0008	
726,000	5,000	.0069	.0007	
755,040	5,200	.0071	.0007	First crack.
784,080	5,400	.0078	.0006	
809,000	5,572	.....	.....	Ultimate strength.

Marks, 43.
Composition: Star Portland cement, 1; sand, 1.
Water used in mortar, 29.42 per cent of cement.
Age, 4 months.
Weight per cubic foot, 134.5 pounds.
Sectional area, 142.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,256	100	0.	0.	Initial load.
28,512	200	.0001	0.	
57,024	400	.0004	0.	
85,536	600	.0008	0.	E=4,167,000 pounds per square inch.
114,048	800	.0010	0.	
142,560	1,000	.0012	0.	E=3,750,000 pounds per square inch.
171,072	1,200	.0015	.0001	
199,584	1,400	.0019	.0001	
228,096	1,600	.0022	.0001	E=3,333,000 pounds per square inch.
256,608	1,800	.0025	.0001	
285,120	2,000	.0028	.0001	
313,632	2,200	.0031	.0001	
342,144	2,400	.0035	.0001	
370,656	2,600	.0039	.0001	
399,168	2,800	.0042	.0001	
427,680	3,000	.0046	.0002	
456,192	3,200	.0050	.0003	
484,704	3,400	.0055	.0003	
513,216	3,600	.0061	.0005	
541,728	3,800	.0067	.0005	
570,240	4,000	.0072	.0006	
598,752	4,200	.0080	.0008	
627,264	4,400	.0087	.0009	
655,776	4,600	.0095	.0010	
684,288	4,800	.0105	.0012	
712,800	5,000	.0114	.0013	
741,312	5,200	.0128	.0018	
769,824	5,400	.0146	.0022	
780,000	5,471	.....	.....	Ultimate strength.

Marks, 52.
Composition: Steel Portland cement, 1; sand, 1.
Water used in mortar, 33.46 per cent of cement.
Age, 4 months.
Weight per cubic foot, 126.6 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per squre inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0005	0.	
43,236	300	.0011	.0002	
57,648	400	.0017	.0004	
72,060	500	.0023	.0007	
86,472	600	.0030	.0009	E=1,190,000 pounds per square inch.
100,884	700	.0039	.0013	
115,296	800	.0048	.0017	
129,708	900	.0057	.0022	
144,120	1,000	.0069	.0028	E=1,098,000 pounds per square inch.
172,944	1,200	.0100	.0048	
201,768	1,400	.0144	.0080	
230,592	1,600	.0209	.0134	
259,416	1,800	.0330	.0235	Ultimate strength. Cube failed upon second application of this load.

Marks, 57.
Composition: Saylor's Portland cement, 1; sand, 1.
Water used in mortar, 28.18 per cent of cement.
Age, 4 months.
Weight per cubic foot, 135.1 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0002	0.	
57,936	400	.0006	0.	
86,904	600	.0009	.0001	E=3,125,000 pounds per square inch.
115,872	800	.0013	.0001	
144,840	1,000	.0017	.0002	E=3,000,000 pounds per square inch.
173,808	1,200	.0021	.0002	
202,776	1,400	.0025	.0002	
231,744	1,600	.0030	.0003	E=2,500,000 pounds per square inch.
260,712	1,800	.0034	.0004	
289,680	2,000	.0040	.0005	
318,648	2,200	.0044	.0006	
347,616	2,400	.0052	.0008	
376,584	2,600	.0058	.0010	
405,552	2,800	.0068	.0012	
434,520	3,000	.0076	.0014	
463,488	3,200	.0088	.0019	
492,456	3,400	.0101	.0023	
521,424	3,600	.0118	.0032	
550,392	3,800	.0140	.0043	
571,400	3,945	.....	.....	Ultimate strength.

Marks, 62.
Composition: Germania Portland cement, 1; sand, 1.
Water used in mortar, 26.33 per cent of cement.
Age, 4 months.
Weight per cubic foot, 135.0 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0002	.0000	
43,488	300	.0004	.0000	
57,984	400	.0006	.0000	
72,480	500	.0009	0.	
86,976	600	.0010	0.	E = 2,500,000 pounds per square inch.
101,472	700	.0013	0.	
115,968	800	.0014	0.	
130,464	900	.0017	.0001	
144,960	1,000	.0019	.0002	E = 2,647,000 pounds per square inch.
173,952	1,200	.0024	.0002	
202,944	1,400	.0029	.0003	
231,936	1,600	.0034	.0004	E = 2,500,000 pounds per square inch.
260,928	1,800	.0039	.0005	
289,920	2,000	.0043	.0006	
318,912	2,200	.0049	.0008	
347,904	2,400	.0055	.0009	
376,896	2,600	.0062	.0011	
405,888	2,800	.0069	.0014	
434,880	3,000	.0079	.0018	
463,872	3,200	.0087	.0020	
492,864	3,400	.0097	.0023	
521,856	3,600	.0111	.0031	
550,848	3,800	.0124	.0037	
570,000	.....	.....	.....	First crack.
579,840	4,000	.0143	.0046	
601,000	4,146	.0184	.....	Ultimate strength.

Marks, 67.
Composition: Hoffman's Rosendale cement, 1; sand, 1.
Water used in mortar, 34.51 per cent of cement.
Age, 4 months.
Weight per cubic foot, 127.9 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged lengths.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0012	.0008	
43,488	300	.0034	.0023	
57,984	400	.0069	.0051	
72,480	500	.0085	.0063	First crack.
86,976	600	.0099	.....	
90,500	624	.....	.....	Ultimate strength.

Marks, 72.
Composition: Norton's Rosendale cement, 1; sand, 1.
Water used in mortar, 37.31 per cent of cement.
Age, 4 months.
Weight per cubic foot, 124.1 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0019	.0018	
43,380	300	.0051	.0035	
57,840	400	.0112	.0082	
62,000	.....	.....	.....	First crack.
72,300	500	.0082	.0056	
82,100	568	.....	.....	Ultimate strength.

Marks, 76.
Composition: Alpha Portland cement, 1; granite dust, 1.
Water used in mortar, 28.19 per cent of cement.
Age, 4 months.
Weight per cubic foot, 137.4 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
57,840	400	.0005	.0001	
86,760	600	.0008	.0001	E = 3,571,000 pounds per square inch.
115,680	800	.0011	.0001	
144,600	1,000	.0013	.0001	E = 3,750,000 pounds per square inch.
173,520	1,200	.0016	.0001	
202,440	1,400	.0019	.0001	
231,360	1,600	.0022	.0001	E = 2,331,000 pounds per square inch.
260,280	1,800	.0024	.0002	
289,200	2,000	.0027	.0002	
318,120	2,200	.0030	.0002	
347,040	2,400	.0033	.0002	
375,960	2,600	.0035	.0002	
404,880	2,800	.0038	.0003	
433,800	3,000	.0041	.0003	
462,720	3,200	.0043	.0004	
491,640	3,400	.0046	.0004	
520,560	3,600	.0049	.0004	
549,480	3,800	.0052	.0005	
578,400	4,000	.0056	.0005	
607,320	4,200	.0060	.0006	
636,240	4,400	.0064	.0007	
665,160	4,600	.0069	.0007	
694,080	4,800	.0074	.0008	
750,500	5,190	.....	.....	Ultimate strength.

Marks, 88.
Composition: Alsen's Portland cement, 1; sand, 1; ¾″ trap rock, 3.
Water used in mortar, 38.12 per cent of cement.
Age, 4 months.
Weight per cubic foot, 150.4 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0003	0.	
57,888	400	.0006	.0001	
72,360	500	.0008	.0001	
86,832	600	.0011	.0001	E=2,500,000 pounds per square inch.
101,304	700	.0013	.0002	
115,776	800	.0015	.0003	
130,248	900	.0019	.0005	
144,720	1,000	.0022	.0006	E=2,812,000 pounds per square inch.
173,664	1,200	.0030	.0008	
202,608	1,400	.0038	.0011	
231,552	1,600	.0046	.0014	E=1,562,000 pounds per square inch.
260,496	1,800	.0059	.0019	
289,440	2,000	.0076	.0028	
318,384	2,200	.0101	.0041	
347,328	2,400	.0136	.0065	
376,272	2,600	.0177	.0091	
405,216	2,800	.0232	.0131	First crack.
440,000	3,040	.....	.....	Ultimate strength.

Marks, 94.
Composition: Alpha Portland cement, 1; sand, 2; 2½″ and ⅝″ trap rock, 2.
Water used in mortar, 42.86 per cent of cement.
Age, 4 months.
Weight per cubic foot, 145.6 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0002	0.	
43,308	300	.0004	.0001	
57,744	400	.0007	.0001	
72,180	500	.0009	.0002	
86,616	600	.0011	.0003	E=3,125,000 pounds per square inch.
101,052	700	.0013	.0004	
115,488	800	.0016	.0004	
129,924	900	.0019	.0005	
144,360	1,000	.0022	.0006	E=2,812,000 pounds per square inch.
173,230	1,200	.0028	.0007	
202,104	1,400	.0036	.0010	
230,976	1,600	.0044	.0013	E=1,562,000 pounds per square inch.
259,848	1,800	.0057	.0018	
288,720	2,000	.0076	.0028	
317,592	2,200	.0103	.0044	
346,464	2,400	.0135	.0064	
372,000	.....	.....	.....	First crack.
375,336	2,600	.0175	.0094	Ultimate strength.

Marks, 96.
Composition: Alpha Portland cement, 1; sand, 2; 2½″ and ⅝″ trap rock, 3.
Water used in mortar, 41.75 per cent of cement.
Age, 4 months.
Weight per cubic foot, 147.6 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0001	0.	
43,560	300	.0004	0.	
58,080	400	.0006	.0001	
72,600	500	.0008	.0001	
87,120	600	.0010	.0002	E=3,125,000 pounds per square inch.
101,640	700	.0012	.0002	
116,160	800	.0014	.0003	
130,680	900	.0017	.0004	
145,200	1,000	.0020	.0004	E=2,812,000 pounds per square inch.
174,240	1,200	.0027	.0006	
203,280	1,400	.0036	.0009	
232,320	1,600	.0045	.0014	E=1,250,000 pounds per square inch.
261,360	1,800	.0067	.0022	
290,400	2,000	.0094	.0038	
319,440	2,200	.0140	.0064	
348,480	2,400	.0280	.0162	Ultimate strength.

Marks, 102.
Composition: Alpha Portland cement, 1; sand, 2; 2½″ and ⅝″ trap rock, 4.
Water used in mortar, 49.13 per cent of cement.
Age, 4 months.
Weight per cubic foot, 148.4 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0003	.0001	
43,452	300	.0006	.0001	
57,936	400	.0009	.0002	
72,420	500	.0011	.0002	
86,904	600	.0014	.0004	E=2,500,000 pounds per square inch.
101,388	700	.0018	.0005	
115,872	800	.0021	.0006	
130,356	900	.0025	.0007	
144,840	1,000	.0029	.0009	E=2,250,000 pounds per square inch.
173,808	1,200	.0039	.0013	
202,776	1,400	.0048	.0016	
231,744	1,600	.0060	.0021	
260,000	.....	.....	.....	First crack.
260,712	1,800	.0076	.0029	
289,680	2,000	.0094	.0037	
318,648	2,200	.0126	.0058	
324,600	2,241	.....	.....	Ultimate strength.

Marks, 106.

Composition: Alpha Portland cement, 1; sand, 2; 2½" and ⅝" trap rock, 5.

Water used in mortar, 49.76 per cent of cement.

Age, 4 months.

Weight per cubic foot, 148.9 pounds.

Sectional area, 144.36 square inches.

Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0001	0.	
43,308	300	.0002	0.	
57,744	400	.0004	0.	
72,180	500	.0006	0.	
86,616	600	.0008	.0001	E=3,571,000 pounds per square inch.
101,052	700	.0011	.0001	
115,488	800	.0014	.0001	
129,924	900	.0017	.0002	
144,360	1,000	.0021	.0003	E=2,500,000 pounds per square inch.
173,232	1,200	.0030	.0006	
202,104	1,400	.0042	.0010	
230,976	1,600	.0057	.0018	E=1,136,000 pounds per square inch.
259,848	1,800	.0078	.0028	
288,720	2,000	.0108	0046	
317,592	2,200	.0151	.0075	
346,464	2,400	.0213	.0118	First crack.
367,000	2,542	.....	.....	Ultimate strength.

Marks, 117.

Composition: Alpha Portland cement, 1; sand, 2; 2½" and ⅝" trap rock, 6.

Water used in mortar, 54.72 per cent of cement.

Age, 4 months.

Weight per cubic foot, 149.7 pounds.

Sectional area, 144.60 square inches.

Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0003	0.	
57,840	400	.0005	.0001	
72,300	500	.0007	.0001	
86,760	600	.0009	.0001	E=3,125,000 pounds per square inch.
101,220	700	0010	.0002	
115,680	800	.0013	.0002	
130,140	900	.0016	.0003	
144,600	1,000	.0018	.0003	E=3,000,000 pounds per square inch.
173,520	1,200	.0026	.0006	
202,440	1,400	.0037	.0010	
231,360	1,600	.0053	.0019	E=1,316,000 pounds per square inch.
260,280	1,800	.0073	.0032	
289,200	2,000	.0105	.0052	
144,600	1,000	.0083	.....	Load left on cube at 5 p. m.
109,200	755	.0085	.....	Load on cube at 8 a. m., after 15 hours.
14,460	100	.....	.0066	
289,200	2,000	.0117	.0069	
318,120	2,200	.0143	.0083	
334,000	2,310	.0184	.....	First crack.
334,600	2,314	.....	.....	Ultimate strength.

Marks, 121.
Composition: Alpha Portland cement, 1; sand, 2; 2½″ trap rock, 4.
Water used in mortar, 48.89 per cent of cement.
Age, 4 months.
Weight per cubic foot, 151.9 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0002	0.	
43,488	300	.0004	.0001	
57,984	400	.0007	.0001	
72,480	500	.0009	.0002	
86,976	600	.0012	.0003	E=2,778,000 pounds per square inch.
101,472	700	.0016	.0004	
115,968	800	.0019	.0006	
130,464	900	.0023	.0007	
144,960	1,000	.0027	.0009	E=1,389,000 pounds per square inch.
173,952	1,200	.0038	.0014	
202,944	1,400	.0051	.0022	
231,936	1,600	.0066	.0031	E=1,250,000 pounds per square inch.
260,928	1,800	.0092	.0047	
289,920	2,000	.0139	.0081	
318,912	2,200	.0236	.0151	First crack.
338,300	2,334	.....	.....	Ultimate strength.

Marks, 127.
Composition: Alpha Portland cement, 1; sand, 3; 2½″ trap rock, 6.
Water used in mortar, 66.67 per cent of cement.
Age, four months.
Weight per cubic foot, 150.6 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0002	0.	
57,936	400	.0004	0.	
72,420	500	.0006	.0001	
86,904	600	.0009	.0001	E=3,125,000 pounds per square inch.
101,388	700	.0012	.0001	
115,872	800	.0015	.0003	
130,356	900	.0020	.0005	
144,840	1,000	.0025	.0006	E=2,368,000 pounds per square inch.
173,808	1,200	.0039	.0012	
202,776	1,400	.0057	.0022	
231,744	1,600	.0080	.0037	
260,712	1,800	.0131	.0078	First crack.
279,900	1,932	.....	.....	Ultimate strength.

Marks, 131.
Composition: Alpha Portland cement, 1; sand, 4; 2½" trap rock, 8.
Water used in mortar, 87.02 per cent of cement.
Age, 4 months.
Weight per cubic foot, 144.1 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0004	.0002	
43,416	300	.0010	.0004	
57,888	400	.0016	.0008	
72,360	500	.0025	.0014	
86,832	600	.0038	.0022	E=1,562,000 pounds per square inch.
101,304	700	.0053	.0034	
115,776	800	.0077	.0052	
130,248	900	.0117	.0086	
144,720	1,000	.0177	.0137	First crack.
164,800	1,139	.....	.....	Ultimate strength.

Marks, 140.
Composition: Alpha Portland cement, 1; sand, 5; 2½" trap rock, 10.
Water used in mortar, 100.50 per cent of cement.
Age, 4 months.
Weight per cubic foot, 139.6 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	.0008	.0004	
43,524	300	.0023	.0016	
58,032	400	.0051	.0038	
72,540	500	.0091	.0071	
87,048	600	.0146	.0117	E=862,000 pounds per square inch.
101,556	700	.0209	.0171	First crack.
125,600	866	.....	.....	Ultimate strength.

Marks, 144.
Composition: Alpha Portland cement, 1; sand, 6; 2½″ trap rock, 12.
Water used in mortar, 124.39 per cent of cement.
Age, 4 months.
Weight per cubic foot, 142 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0006	.0002	
43,344	300	.0013	.0007	
57,792	400	.0024	.0014	
72,240	500	.0043	.0028	
86,688	600	.0073	.0052	E = 1,190,000 pounds per square inch.
101,136	700	.0113	.0083	
112,000	.....	.....	.....	First crack.
115,584	800	.0131	.0089	
115,700	801	.....	.....	Ultimate strength.

Marks, 153.
Composition: Alpha Portland cement, 1; sand, 2; ⅝″ trap rock, 4.
Water used in mortar, 55.31 per cent of cement.
Age, 4 months.
Weight per cubic foot, 143.1 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0002	0.	
43,344	300	.0005	.0001	
57,792	400	.0006	.0001	
72,240	500	.0009	.0001	
86,688	600	.0010	.0001	E = 2,778,000 pounds per square inch.
101,136	700	.0012	.0001	
115,584	800	.0015	.0002	
130,032	900	.0017	.0002	
134,480	1,000	.0020	.0003	E = 2,647,000 pounds per square inch.
173,376	1,200	.0027	.0004	
202,272	1,400	.0034	.0005	
231,168	1,600	.0042	.0008	E = 1,429,000 pounds per square inch.
260,064	1,800	.0052	.0011	
288,960	2,000	.0069	.0017	
317,856	2,200	.0088	.0025	
346,752	2,400	.0121	.0042	
375,648	2,600	.0175	.....	Ultimate strength.

Marks, 167.
Composition: Alpha Portland cement, 1; sand, 3; ⅝″ trap rock, 6.
Water used in mortar, 71.15 per cent of cement.
Age, 4 months.
Weight per cubic foot, 140.2 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0005	.0001	
57,792	400	.0007	.0001	
72,240	500	.0010	.0002	
86,688	600	.0013	.0002	E=2,273,000 pounds per square inch.
101,136	700	.0017	.0003	
115,584	800	.0022	.0005	
130,032	900	.0026	.0006	
144,480	1,000	.0034	.0009	E=1,800,000 pounds per square inch.
173,376	1,200	.0053	.0019	
202,272	1,400	.0121	.0066	
217,000	1,502	.0180	.....	Ultimate strength.

Marks, 180.
Composition: Alpha Portland cement, 1; sand, 4; ⅜″ trap rock, 8.
Water used in mortar, 96.62 per cent of cement.
Age, 4 months.
Weight per cubic foot, 135.2 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0002	0.	
43,344	300	.0004	0.	
57,792	400	.0007	0.	
72,240	500	.0009	0.	
86,688	600	.0013	.0001	E=2,083,000 pounds per square inch.
101,136	700	.0017	.0002	
115,584	800	.0024	.0005	
130,032	900	.0037	.0012	
137,000	948	.0042	.....	Ultimate strength.

Marks, 191.
Composition: Alpha Portland cement, 1; sand, 5; ⅝″ trap rock, 10.
Water used in mortar, 118.57 per cent of cement.
Age, 4 months.
Weight per cubic foot, 134.3 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0003	0.	
43,380	300	.0011	.0003	
57,840	400	.0022	.0011	
72,300	500	.0057	.0037	
86,760	600	.0126	.0097	E=862,000 pounds per square inch.
107 700	745	.....	.....	Ultimate strength.

Marks, 205.
Composition: Alpha Portland cement, 1; sand, 6; ⅝″ trap rock, 12.
Water used in mortar, 149.52 per cent of cement.
Age, 4 months.
Weight per cubic foot, 135 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0003	0.	
43,380	300	.0007	.0001	
57,840	400	.0012	.0003	
72,300	500	.0018	.0006	
86,760	600	.0025	.0010	E = 1,667,000 pounds per square inch.
101,220	700	.0040	.0018	
115,680	800	.0061	.0034	
128,600	889	.0144	.....	Ultimate strength.

Marks, 217.
Composition: Alpha Portland cement, 1; sand, 2; $\frac{5}{8}$″ trap rock, 2.
Water used in mortar, 48.89 per cent of cement.
Age, 3 months.
Weight per cubic foot, 137.7 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0003	0.	
58,128	400	.0004	0.	
72,660	500	.0006	0.	
87,192	600	.0009	0.	E=2,778,000 pounds per square inch.
101,724	700	.0011	0.	
116,256	800	.0013	0.	
130,788	900	.0015	.0001	
145,320	1,000	.0019	.0002	E=2,647,000 pounds per square inch.
174,384	1,200	.0023	.0002	
203,448	1,400	.0030	.0004	
232,512	1,600	.0039	.0007	E=1,613,000 pounds per square inch
261,576	1,800	.0050	.0010	
290,640	2,000	.0065	.0017	
319,704	2,200	.0091	.0030	
343,600	2,364	.....	.....	Ultimate strength.

Marks, 222.
Composition: Alpha Portland cement, 1; sand, 2; $\frac{5}{8}$″ trap rock, 3.
Water used in mortar, 49.39 per cent of cement.
Age, 3 months.
Weight per cubic foot, 143.5 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0001	0.	
43,200	300	.0003	0.	
57,600	400	.0006	0.	
72,000	500	.0007	0.	
86,400	600	.0009	.0001	E=3,125,000 pounds per square inch.
100,800	700	.0011	.0001	
115,200	800	.0014	.0001	
129,600	900	.0017	.0002	
144,000	1,000	.0020	.0003	E=2,647,000 pounds per square inch.
172,800	1,200	.0029	.0006	
201,600	1,400	.0044	.0014	E=909,000 pounds per square inch.
230,400	1,600	.0069	.0029	
259,200	1,800	.0116	.0061	
288,000	2,000	.0191	.0119	
309,900	2,152	.....	.....	Ultimate strength.

Marks, 228.
Composition: Alpha Portland cement, 1; sand, 2; ¾″ trap rock, 5.
Water used in mortar, 57.28 per cent of cement.
Age, 3 months.
Weight per cubic foot, 140.5 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0001	0.	
43,164	300	.0003	0.	
57,552	400	.0006	0.	
71,940	500	.0009	.0001	
86,328	600	.0012	.0001	E = 2,273,000 pounds per square inch.
100,716	700	.0015	.0002	
115,104	800	.0020	.0004	
129,492	900	.0024	.0006	
143,880	1,000	.0030	.0008	E = 2,045,000 pounds per square inch.
172,656	1,200	.0043	.0014	
201,432	1,400	.0067	.0025	
230,208	1,600	.0105	.0050	
258,984	1,800	.0220	.0139	
263,000	1,828	.....	.....	Ultimate strength.

Marks, 235.
Composition: Alpha Portland cement, 1; sand, 2; ¾″ trap rock, 6.
Water used in mortar, 60.29 per cent of cement.
Age, 3 months.
Weight per cubic foot, 142.9 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0002	0.	
43,236	300	.0005	.0001	
57,648	400	.0008	.0001	
72,060	500	.0011	.0001	
86,472	600	.0014	.0002	E = 2,083,000 pounds per square inch.
100,884	700	.0019	.0004	
115,296	800	.0023	.0005	
129,708	900	.0030	.0007	
144,120	1,000	.0037	.0010	E = 1,667,000 pounds per square inch.
172,944	1,200	.0059	.0021	
201,768	1,400	.0096	.0042	
230,592	1,600	.0174	.0097	
267,100	1,853	.....	.....	Ultimate strength.

Marks, 243.
Composition: Alpha Portland cement, 1; sand, 2; $\frac{5}{8}$″ trap rock, 7.
Water used in mortar, 61.35 per cent of cement.
Age, 3 months.
Weight per cubic foot, 132.5 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0002	.0001	
43,272	300	.0007	.0001	
57,696	400	.0012	.0004	
72,120	500	.0020	.0007	
86,544	600	.0031	.0013	E = 1,389,000 pounds per square inch.
100,968	700	.0052	.0027	
115,392	800	.0082	.0049	
129,816	900	.0140	.0096	
141,800	983	.....	.....	Ultimate strength.

Marks, 252.
Composition: Alpha Portland cement, 1; sand, 2; $\frac{5}{8}$″ trap rock, 8.
Water used in mortar, 66.67 per cent of cement.
Age, 3 months.
Weight per cubic foot, 130.7 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	.0003	0.	
43,524	300	.0007	.0001	
58,032	400	.0011	.0002	
72,540	500	.0018	.0005	
87,048	600	.0030	.0011	E = 1,316,000 pounds per square inch.
101,556	700	.0054	.0028	
116,064	800	.0121	.0061	
130,572	900	.0290	.0232	Ultimate strength.

Marks, 263.
Composition: Alpha Portland cement, 1; sand, 2; $\frac{3}{8}$″ trap rock, 9.
Water used in mortar, 72.38 per cent of cement.
Age, 3 months.
Weight per cubic foot, 133.1 pounds.
Sectional area 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0002	0.	
43,272	300	.0010	.0002	
57,696	400	.0019	.0006	
72,120	500	.0036	.0016	
86,544	600	.0071	.0042	E = 862,000 pounds per square inch.
100,968	700	.0143	.0100	
115,200	799	.....	.....	Ultimate strength.

Marks, 264.
Composition: Alpha Portland cement, 1; sand, 2; $1\frac{1}{2}$″ trap rock, 2.
Water used in mortar, 47.26 per cent of cement.
Age, 3 months.
Weight per cubic foot, 140.5 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0003	0.	
57,696	400	.0005	0.	
72,120	500	.0007	0.	
86,544	600	.0010	.0001	E = 2,778,000 pounds per square inch.
100,968	700	.0012	.0001	
115,392	800	.0014	.0002	
129,816	900	.0016	.0003	
144,240	1,000	.0020	.0004	E = 2,812,000 pounds per square inch.
173,088	1,200	.0028	.0006	
201,936	1,400	.0038	.0010	
230,784	1,600	.0055	.0019	
259,632	1,800	.0098	.0044	
263,000	1,823	.....	.....	Ultimate strength.

Marks, 272.
Composition: Alpha-Portland cement, 1; sand, 2; 1½″ trap rock, 3.
Water used in mortar, 50.98 per cent of cement.
Age, 3 months.
Weight per cubic foot, 146.9 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0004	0.	
57,792	400	.0005	0.	
72,240	500	.0009	.0002	
86,688	600	.0012	.0003	E=2,778,000 pounds per square inch.
101,136	700	.0015	.0004	
115,584	800	.0018	.0007	
130,032	900	.0024	.0009	
144,480	1,000	.0030	.0012	E=2,500,000 pounds per square inch.
173,376	1,200	.0048	.0023	
202,272	1,400	.0075	.0041	
231,168	1,600	.0114	.0072	
260,064	1,800	.0163	.0110	
290,200	2,009	.....	.....	Ultimate strength.

Marks, 274.
Composition: Alpha-Portland cement, 1; sand, 2; 1½″ trap rock, 4.
Water used in mortar 55.56 per cent of cement.
Age, 3 months.
Weight per cubic foot, 151.1 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0002	0.	
43,308	300	.0004	.0001	
57,744	400	.0007	.0001	
72,180	500	.0010	.0002	
86,616	600	.0013	.0004	E=2,778,000 pounds per square inch.
101,052	700	.0015	.0005	
115,488	800	.0019	.0006	
129,924	900	.0023	.0008	
144,360	1,000	.0029	.0010	E=2,368,000 pounds per square inch.
173,232	1,200	.0040	.0015	
202,104	1,400	.0051	.0021	
230,976	1,600	.0065	.0028	
259,848	1,800	.0076	.0081	
288,720	2,000	.0076	.0025	First crack.
317,500	2,199	.....	.....	Ultimate strength.

Marks, 278.
Composition: Alpha-Portland cement, 1; sand, 2; 1½″ trap rock, 5.
Water used in mortar, 46.46 per cent of cement.
Age, 3 months.
Weight per cubic foot, 152.0 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	.0001	0.	
43,524	300	.0004	0.	
58,032	400	.0007	.0001	
72,540	500	.0010	.0002	
87,048	600	.0013	.0002	E=2,273,000 pounds per square inch.
101,556	700	.0015	.0003	
116,064	800	.0019	.0005	
130,572	900	.0022	.0006	
145,080	1,000	.0026	.0007	E=2,368,000 pounds per square inch.
174,096	1,200	.0036	.0011	
203,112	1,400	.0047	.0014	
232,128	1,600	.0063	.0023	E=1,250,000 pounds per square inch.
261,144	1,800	.0085	.0035	
290,160	2,000	.0111	.0052	
391,100	2,696	.....	.....	Tensile strength.

Marks, 286.
Composition: Alpha-Portland cement, 1; sand, 2; 1½″ trap rock, 6.
Water used in mortar, 64.68 per cent of cement.
Age, 3 months.
Weight per cubic foot, 154.3 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0002	0.	
43,488	300	.0006	.0001	
57,984	400	.0010	.0003	
72,480	500	.0013	.0005	
86,976	600	.0018	.0007	E=2,273,000 pounds per square inch.
101,472	700	.0024	.0010	
115,968	800	.0029	.0012	
130,464	900	.0035	.0014	
144,960	1,000	.0042	.0017	E=1,800,000 pounds per square inch.
173,952	1,200	.0057	.0026	
202,944	1,400	.0076	.0037	
231,936	1,600	.0097	.0051	E=1,429,000 pounds per square inch.
260,928	1,800	.0123	.0071	
289,920	2,000	.0156	.0096	
318,000	.....	.....	.....	First crack.
318,912	2,200	.0201	.0131	
368,000	2,539	.....	.....	Ultimate strength.

Marks, 295.
Composition: Alpha-Portland cement, 1; sand, 2; 1½″ trap rock, 7.
Water used in mortar 70.24 per cent of cement.
Age, 3 months.
Weight per cubic foot, 148.7 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0008	0.	
43,308	300	.0009	.0003	
57,744	400	.0015	.0006	
72,280	500	.0024	.0011	
86,616	600	.0036	.0018	E=1,389,000 pounds per square inch.
101,052	700	.0052	.0031	
115,488	800	.0075	.0045	
129,924	900	.0101	.0064	
144,360	1,000	.0133	.0089	E=1,023,000 pounds per square inch.
173,232	1,200	.0200	.0142	First crack.
221,500	1,534	.....	.....	Ultimate strength.

Marks, 301.
Composition: Alpha Portland cement, 1; sand, 2; 1½″ trap rock, 8.
Water used in mortar, 70.47 per cent of cement.
Age, 3 months.
Weight per cubic foot, 141.7 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,556	100	0.	0.	Initial load.
29,112	200	.0003	.0001	
43,668	300	.0007	.0002	
58,224	400	.0013	.0006	
72,780	500	.0020	.0010	
87,336	600	.0034	.0018	E=1,562,000 pounds per square inch.
101,892	700	.0050	.0030	
116,448	800	.0071	.0044	
131,004	900	.0099	.0062	
145,560	1,000	.0140	.0094	E=978,000 pounds per square inch.
160,116	1,100	.0230	.0167	First crack.
161,400	1,109	.....	.....	Ultimate strength.

Marks, 402.
Composition: Alpha Portland cement, 1; sand, 2; 2½″ trap rock, 4.
Water used in mortar 63.32 per cent of cement.
Age, 3 months.
Weight per cubic foot, 152.1 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0005	0.	
57,888	400	.0007	.0001	
72,360	500	.0011	.0004	
86,832	600	.0014	.0005	E=2,778,000 pounds per square inch.
101,304	700	.0020	.0008	
115,776	800	.0024	.0010	
130,248	900	.0029	.0012	
144,720	1,000	.0036	.0016	E=2,250,000 pounds per square inch.
173,664	1,200	.0050	.0023	
202,608	1,400	.0068	.0034	
231,552	1,600	.0090	.0047	
260,496	1,800	.0123	.0074	
281,000	.....	.....	.....	First crack.
289,440	2,000	.0174	.0110	
318,384	2,200	.0220	.0150	Ultimate strength. Failed upon the second application of the maximum load.

Marks, 411.
Composition: Steel Portland cement, 1; sand, 2; 2½″ trap rock, 4.
Water used in mortar 64.67 per cent cement.
Age, 3 months.
Weight per cubic foot, 151.6 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	.0001	
43,380	300	.0005	.0001	
57,840	400	.0008	.0002	
72,300	500	.0011	.0003	
86,760	600	.0015	.0005	E=2,500,000 pounds per square inch.
101,220	700	.0020	.0008	
115,680	800	.0026	.0013	
130,140	900	.0039	.0022	
144,600	1,000	.0048	.0030	E=2,500,000 pounds per square inch.
173,520	1,200	.0086	.0060	
202,440	1,400	.0132	.0099	
231,360	1,600	.0202	.0158	First crack.
251,000	1,736	.....	.....	Ultimate strength.

Marks, 431.
Composition: Norton's Rosendale cement, 1; sand, 2; 2½" trap rock, 4.
Water used in mortar, 70.13 per cent of cement.
Age, 3 months.
Weight per cubic foot, 145.9 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
7,218	50	0.	0.	Initial load.
14,436	100	.0029	.0027	
21,654	150	.0063	.0055	
28,872	200	.0161	.0149	First crack.
32,600	226	.0800	.....	
56,200	389	.....	.....	Ultimate strength.

Marks, 435.
Composition: Norton's Rosendale cement, 1; sand, 2.
Water used in mortar, 51.91 per cent of cement.
Age, 3 months.
Weight per cubic foot, 122 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
7,254	50	0.	0.	Initial load.
14,508	100	.0005	.0002	
21,762	150	.0018	.0009	
29,016	200	.0048	.0031	
33,200	229	.0090	.....	First crack.
42,200	291	.....	.....	Ultimate strength.

Marks, 446.

Composition: Alpha Portland cement, 1; sand, 2; 1½″ to 3″ pebbles, 4.

Water used in mortar, 48.68 per cent of cement.

Age, 3 months.

Weight per cubic foot, 145.9 pounds.

Sectional area, 144.72 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0003	0.	
57,888	400	.0005	0.	
72,360	500	.0007	.0001	
86,832	600	.0009	.0001	E=3,125,000 pounds per square inch.
101,304	700	.0011	.0002	
115,776	800	.0012	.0002	
130,248	900	.0014	.0003	
144,720	1,000	.0016	.0003	E=3,461,000 pounds per square inch.
173,664	1,200	.0021	.0005	
202,608	1,400	.0025	.0005	
231,552	1,600	.0029	.0006	E=3,333,000 pounds per square inch.
260,496	1,800	.0032	.0006	
289,440	2,000	.0035	.0007	
318,384	2,200	.0040	.0008	
347,328	2,400	.0044	.0009	
376,272	2,600	.0051	.0010	
405,216	2,800	.0060	.0012	
434,160	3,000	.0073	.0014	
440,000	.....	.....	.....	First crack.
463,104	3,200	.0086	.0009	Ultimate strength.

Marks, 456.

Composition: Alpha Portland cement, 1; sand, 2; 1½″ to 2½″ broken brick, 4.

Water used in mortar, 64.69 per cent of cement.

Age, 3 months.

Weight per cubic foot, 130.3 pounds.

Sectional area, 145.08 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	.0003	0.	
43,524	300	.0004	0.	
58,032	400	.0007	.0001	
72,540	500	.0009	.0001	
87,048	600	.0012	.0002	E=2,500,000 pounds per square inch.
101,556	700	.0014	.0002	
116,064	800	.0017	.0003	
130,572	900	.0021	.0004	
145,080	1,000	.0024	.0005	E=2,368,000 pounds per square inch.
174,096	1,200	.0033	.0007	
203,112	1,400	.0042	.0009	
232,128	1,600	.0055	.0014	E=1,020,000 pounds per square inch.
261,144	1,800	.0071	.0019	
290,160	2,000	.0101	.0033	
319,176	2,200	.0151	.0056	First crack.
348,192	2,400	.0230	.0090	
360,500	2,485	.....	.....	Ultimate strength.

Marks, 466.

Composition: Alpha Portland cement, 1; sand, 3; 1½" to 2½" broken brick, 6.

Water used in mortar, 82.82 per cent of cement.

Age, 3 months.

Weight per cubic foot, 128.9 pounds.

Sectional area, 145.32 square inches.

Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0004	0.	
58,128	400	.0007	0.	
72,660	500	.0009	0.	
87,192	600	.0011	0.	E=2,273,000 pounds per square inch.
101,724	700	.0014	0.	
116,256	800	.0017	.0001	
130,788	900	.0020	.0002	
145,320	1,000	.0024	.0003	E=2,143,000 pounds per square inch.
174,384	1,200	.0033	.0005	
203,448	1,400	.0043	.0010	
232,512	1,600	.0054	.0015	E=1,250,000 pounds per square inch.
261,576	1,800	.0073	.0022	
290,640	2,000	.0099	.0038	
319,704	2,200	.0132	.0056	
321,000	.....	.....	.....	First crack.
348,768	2,400	.0188	.0087	Ultimate strength.

Marks, 483.
Composition: Alpha Portland cement, 1; granite dust, 1.
Water used in mortar, 32.46 per cent of cement.
Age, 3 months.
Weight per cubic foot, 136.9 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0002	0.	
58,128	400	.0005	.0001	
87,192	600	.0008	.0001	E=3,571.000 pounds per square inch.
116,256	800	.0010	.0001	
145,320	1,000	.0012	0.	E=3,750,000 pounds per square inch.
174,384	1,200	.0013	—.0001	
203,448	1,400	.0014	—.0001	
232,512	1,600	.0016	—.0002	E=5,000,000 pounds per square inch.
261,576	1,800	.0018	—.0002	
290,640	2,000	.0020	—.0002	
319,704	2,200	.0021	—.0002	
348,768	2,400	.0023	—.0001	
377,832	2,600	.0025	—.0001	
406,896	2,800	.0027	—.0001	
435,960	3,000	.0030	0.	
465,024	3,200	.0032	0.	
494,088	3,400	.0034	0.	
523,152	3,600	.0037	.0001	
552,216	3,800	.0039	.0001	
581,280	4,000	.0042	.0001	
610,344	4,200	.0043	.0001	
639,408	4,400	.0047	.0002	
668,472	4,600	.0050	.0003	
697,536	4,800	.0054	.0004	
726,600	5,000	.0057	.0004	
755,664	5,200	.0060	.0005	First crack.
784,728	5,400	.0064	.0005	
810,000	5,574	.0105	.....	Ultimate strength. Sustained the maximum load 1 minute, then failed.

Marks, 485.
Composition: Alpha Portland cement, 1; granite dust, 2.
Water used in mortar, 40.18 per cent of cement.
Age, 3 months.
Weight per cubic foot, 134.1 pounds.
Sectional area, 145.68 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,568	100	0.	0.	Initial load.
29,136	200	.0002	0.	
58,272	400	.0005	0.	
87,408	600	.0008	.0001	E=3,571,000 pounds per square inch.
116,544	800	.0010	.0001	
145,680	1,000	.0012	.0001	E=4,091,000 pounds per square inch.
174,816	1,200	.0015	.0001	
203,952	1,400	.0017	.0001	
233,088	1,600	.0020	.0002	E=3,846,000 pounds per square inch.
262,224	1,800	.0023	.0002	
291,360	2,000	.0027	.0003	
320,496	2,200	.0030	.0004	
349,632	2,400	.0033	.0004	
378,768	2,600	.0035	.0006	
407,904	2,800	.0039	.0005	
437,040	3,000	.0042	.0005	
466,176	3,200	.0044	.0005	
495,312	3,400	.0048	.0005	
524,448	3,600	.0052	.0006	
553,584	3,800	.0056	.0007	
582,720	4,000	.0059	.0007	
611,856	4,200	.0063	.0008	
640,992	4,400	.0068	.0004	
650,500	4,465	.....	.....	Ultimate strength.

Marks, 489.
Composition: Alpha Portland cement, 1; granite dust, 3.
Water used in mortar, 53.15 per cent of cement.
Age, 3 months.
Weight per cubic foot, 127.6 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0002	0.	
58,080	400	.0007	.0001	
87,120	600	.0011	.0002	E=2,778,000 pounds per square inch.
116,160	800	.0016	.0002	
145,200	1,000	.0020	.0002	E=2,500,000 pounds per square inch.
174,240	1,200	.0026	.0003	
203,280	1,400	.0034	.0004	
232,320	1,600	.0042	.0006	E=1,562,000 pounds per square inch.
261,360	1,800	.0053	.0011	
290,400	2,000	.0065	.0015	
319,440	2,200	.0084	.0023	
348,480	2,400	.0120	.0043	
365,000	2,514	.....	.....	Ultimate strength.

Marks, 494.
Composition: Alpha Portland cement, 1; granite dust, 2; 2½" trap rock, 4.
Water used in mortar, 59.09 per cent of cement.
Age, 3 months.
Weight per cubic foot, 154.2 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,544	100	0.	0.	Initial load.
29,088	200	.0002	0.	
58,176	400	.0006	.0001	
87,264	600	.0013	.0003	E=2,500,000 pounds per square inch.
116,352	800	.0021	.0007	
145,440	1,000	.0033	.0011	E=2,045,000 pounds per square inch.
174,528	1,200	.0045	.0018	
203,616	1,400	.0063	.0027	
232,704	1,600	.0088	.0044	E=1,351,000 pounds per square inch.
261,792	1,800	.0113	.0060	
290,880	2,000	.0146	.0087	
292,000	.....	.....	.....	First crack.
319,968	2,200	.0184	.0117	
349,056	2,400	.0223	.0147	
401,400	2,760	.....	.....	Ultimate strength.

FOUR CUBES OF CONCRETE MADE FROM A LOT OF CEMENT WHICH HAD BEEN IN STORE. THE CEMENT HAD SWELLED IN THE BARREL.

Marks, 78.
Composition: Alsen cement, 1; fine sand, 1; broken stone, 3. (¾" ring stone.)
Water used in mortar, 35.26 per cent of cement.
Age, 11 days.
Set in mold, 1 day; in water, 10 days.
Weight per cubic foot, 146.15 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,544	100	0.	0.	Initial load.
29,088	200	.0002	0.	
43,632	300	.0004	.0001	
58,176	400	.0007	.0001	
72,720	500	.0010	.0002	
87,264	600	.0014	.0004	E=2,500,000 pounds per square inch.
101,808	700	.0019	.0006	
116,352	800	.0025	.0009	
130,896	900	.0034	.0014	
145,440	1,000	.0046	.0022	E=1,875,000 pounds per square inch.
174,528	1,200	.0091	.0054	
193,700	1,332	.....	.....	Ultimate strength.

Marks, 79.
Composition: Alsen cement, 1; fine sand, 1; broken stone, 3. ($\frac{3}{4}$" ring stone.)
Water used in mortar, 35.26 per cent of cement.
Age, 26 days.
Set in mold, 1 day; in water, 25 days.
Weight per cubic foot, 149.01 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5".

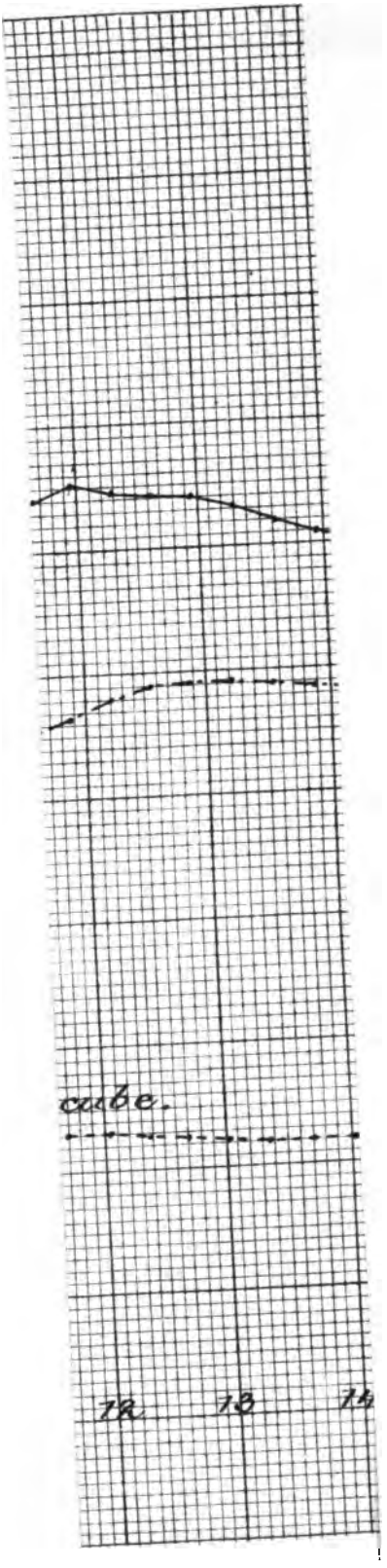
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0002	0.	
57,936	400	.0003	0.	
72,420	500	.0004	0.	
86,904	600	.0005	0.	E=5,000,000 pounds per square inch.
101,388	700	.0007	0.	
115,872	800	.0010	0.	
130,356	900	.0012	0.	
144,840	1,000	.0015	0.	E=3,000,000 pounds per square inch.
173,808	1,200	.0019	.0001	
202,776	1,400	.0030	.0008	
222,600	1,537	.....	.....	Ultimate strength.

Marks, 80.
Composition: Alsen cement, 1; fine sand, 1; broken stone, 3. ($\frac{3}{4}$" ring stone.)
Water used in mortar, 35.26 per cent of cement.
Age, 41 days.
Set in mold, 1 day; in water, 40 days.
Weight per cubic foot, 148.63 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0003	0.	
57,936	400	.0004	0.	
72,420	500	.0006	0.	
86,904	600	.0008	.0001	E=3,571,000 pounds per square inch.
101,388	700	.0010	.0001	
115,872	800	.0012	.0002	
130,356	900	.0014	.0002	
144,840	1,000	.0018	.0003	E=3,000,000 pounds per square inch.
173,808	1,200	.0024	.0005	
202,776	1,400	.0033	.0003	E=1,351,000 pounds per square inch.
231,744	1,600	.0048	.0016	
260,712	1,800	.0064	.0022	
289,680	2,000	.0090	.0038	
318,648	2,200	.0158	.....	Ultimate strength.

Marks, 81.
Composition: Alsen cement, 1; fine sand, 1; broken stone, 3. ($\frac{3}{4}$″ ring stone.)
Water used in mortar, 35.26 per cent of cement.
Age, 48 days.
Set in mold, 1 day; in water, 47 days.
Weight per cubic foot, 151.37 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
15,544	100	0.	0.	Initial load.
29,088	200	.0001	0.	
43,632	300	.0004	.0001	
58,176	400	.0007	.0001	
72,720	500	.0009	.0002	
87,264	600	.0011	.0002	E=2,778,000 pounds per square inch.
101,808	700	.0013	.0003	
116,352	800	.0016	.0004	
130,896	900	.0019	.0005	
145,440	1,000	.0023	.0006	E=2,647,000 pounds per square inch.
174,528	1,200	.0030	.0008	
203,616	1,400	.0038	.0011	E=1,515,000 pounds per square inch.
232,704	1,600	.0050	.0017	
261,792	1,800	.0064	.0024	
290,880	2,000	.0087	.0037	
319,968	2,200	.0120	.0058	
349,056	2,400	.0180	.0099	First crack.
378,144	2,600	.0270	.0170	Ultimate strength.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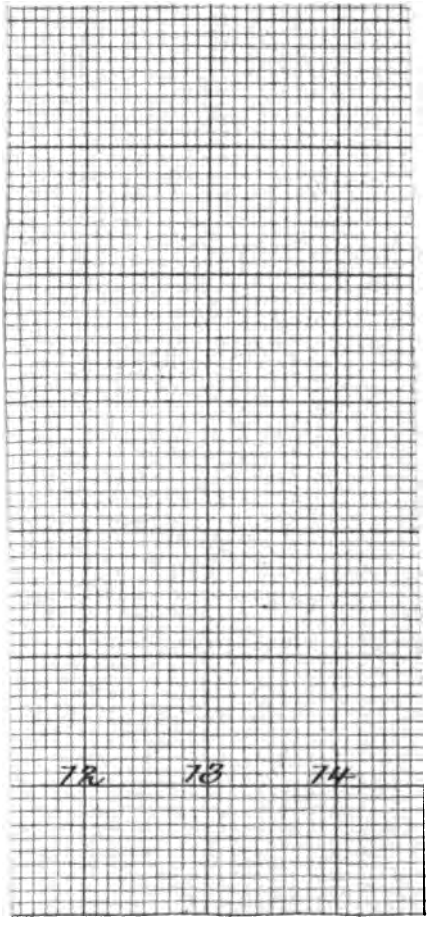
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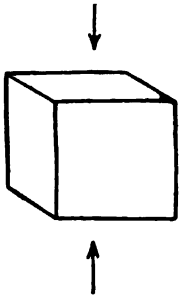
CONCRETE

FROM

U. S. ENGINEER CORPS, KEY WEST, FLA.

835

CONCRETE FROM U. S. ENGINEER CORPS.



The cubes were allowed to set 1 day in air and 27 days in water, and balance of time in air.
Age when tested about three months.

No. of test.	Marks.	Composition.		Weight.		Weight per cubic foot.	Dimensions.			Sectional area.	First Crack.	Ultimate strength.	
		Portland cement.	Sand and broken brick.				Height.	Compressed surface.				Total.	Per square inch.
				Lbs.	*Oz.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. Inches.*	*Pounds.*	*Pounds.*	*Pounds.*
9659	1	1	4—Broken brick that passed a screen having meshes ¾	13	0	102.6	6.04	6.08	6.01	36.24	35,380	35,380	976
9660	1		of an inch diameter	13	1	102.6	6.02	6.06	6.04	36.60	30,100	30,100	822
9661	2	1	2—Powdered brick that passed through a No. 20 sieve	12	5	97.5	6.02	6.08	6.01	36.24	37,100	37,100	1,024
9662	2			13	4½	104.3	6.04	6.05	6.02	36.42	58,200	58,200	1,598
9663	3	1	2—Coral sand; the sand screened through a No. 20 sieve	12	10½	100.1	6.08	6.02	6.01	36.18	18,200	18,200	503
9664	3			12	15½	102.8	6.04	6.00	6.02	36.12	30,700	30,700	850
9665	4	1	2—Sand that passed through a No. 20 sieve	13	4	104.6	6.08	6.04	6.01	36.30	25,300	25,300	697
9666	4		4—Broken brick passed by ¾″ screen and retained by No. 20 sieve	13	10½	107.1	6.07	6.04	6.02	36.36	31,400	31,400	864
9667	5	1	2—Coral sand that passed through a No. 20 sieve	13	3½	104.5	6.06	6.01	6.00	36.06	24,750	24,750	686
9668	5		4—Broken brick passed by ¾″ screen and retained by No. 20 sieve	13	8¾	105.5	6.10	6.04	6.01	36.30	25,620	25,620	706

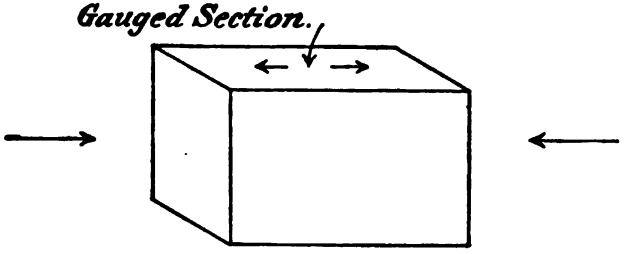
Concrete from U. S. Engineer Corps.

No. of test.	Mark.	Composition.		Weight.		Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
		Portland cement.	Sand and broken brick.				Height.	Compressed surface.				Total.	Per square inch.
				Lbs.	*Oz.*	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. Inches.*	*Pounds.*	*Pounds.*	*Pounds.*
9669	6	1	2—Silicious (from Pensacola) sand	16	9	120.3	6.06	6.08	6.01	36.24	96,100	96,100	2,707
9670	6			17	½	134.4	6.06	6.00	6.02	36.12	118,100	118,100	3,131
9671	7	1	2—Silicious (Pensacola) sand that passed through a No. 20 sieve	13	9	106.7	6.07	6.01	6.02	36.18	28,400	28,400	785
9672	7		4—Broken brick passed by ½" screen and retained by No. 20 sieve	13	6	104.4	6.05	6.08	6.02	36.60	21,300	21,300	582
9673	8	1	2—Silicious (Pensacola) sand that passed through a No. 20 sieve	16	12½	132.7	6.07	6.00	6.00	36.00	62,100	62,100	1,725
9674	8		4—Broken granite passed by ½" screen and retained by No. 20 sieve	16	12½	131.9	6.06	6.01	6.02	36.18	53,500	53,500	1,479

COMPRESSION TESTS OF CONCRETE PRISMS

FROM

BOSTON TRANSIT COMMISSION.



Composition: Alsen cement, 1; sand, 2; broken stone, 4.

The mortar was made first and then 4 parts of broken stone from ¼″ to ½″ diameter added.

No. of test.	Marks.	Age.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
			Height.	Compressed surface.				Total.	Per square inch.
		Days.	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*
10837	7/7	19	12.11	8.03	8.10	65.04	109,200	109,200	1,678
10838	7/7	19	12.12	8.00	8.06	64.48	116,950	116,950	1,814
10839	7/7	19	12.07	8.04	8.08	64.96	118,400	118,400	1,823
10840	7/7	19	12.08	8.04	8.05	64.72	142,800	144,150	2,227
10841	7/7	20	12.18	8.01	8.03	64.32	135,072	154,368	2,400
10842	7/7	20	12.03	8.02	8.01	64.24	147,752	147,752	2,300
10843	7/13	13	12.10	8.12	8.01	65.04	131,900	131,900	2,028
10844	7/13	13	12.11	8.11	8.03	65.12	120,600	120,600	1,852
10845	7/13	14	12.13	8.09	8.12	65.69	118,242	118,242	1,800
10846	7/13	14	11.97	8.16	8.03	65.52	123,100	123,100	1,879
10847	7/15	11	12.12	8.02	8.17	65.52	68,620	68,620	1,047
10848	7/15	11	12.15	8.06	8.11	65.37	88,200	95,150	1,456
10849	7/15	11	12.12	8.06	8.11	65.37	98,055	117,200	1,793
10850	7/15	12	12.14	8.10	8.09	65.53	98,295	101,900	1,555
10851	7/20	6	12.09	8.05	8.15	65.61	61,000	64,600	985
10852	7/20	6	12.00	8.05	8.06	64.88	62,600	62,600	965
10853	7/20	6	12.18	8.01	8.05	64.48	64,480	68,450	1,062
10854	7/20	6	12.10	8.02	8.07	64.72	71,192	83,700	1,293

No. 10841.

Marks, 7/7.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 20 days.
Height, 12″.18.
Sectional area, 8″.01×8″.03=64.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,432	100	0.	0.	Initial load.
12,864	200	.0001	0.	
19,296	300	.0003	0.	
25,728	400	.0005	.0001	
32,160	500	.0006	.0002	
38,592	600	.0008	.0002	E=4,167,000 pounds per square inch.
45,024	700	.0010	.0008	
51,456	800	.0013	.0008	
57,888	900	.0015	.0004	
64,320	1,000	.0017	.0005	E=3,750,000 pounds per square inch.
70,752	1,100	.0020	.0006	
77,184	1,200	.0023	.0007	
83,616	1,300	.0028	.0008	
90,048	1,400	.0033	.0010	
96,480	1,500	.0039	.0013	
102,912	1,600	.0045	.0016	
109,344	1,700	.0053	.0019	
115,776	1,800	.0062	.0024	
122,208	1,900	.0075	.0032	
128,640	2,000	.0089	.0040	
135,072	2,100	.0110	.0058	First crack.
141,504	2,200	.0131	.0074	
147,936	2,300	.0165	.0101	
154,368	2,400	.0220	.....	Ultimate strength.

No. 10842.

Marks, 7/7.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 20 days.
Height, 12″.03.
Sectional area, 8″.02×8″.01=64.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,424	100	0.	0.	Initial load.
12,848	200	0.	0.	
19,272	300	.0001	0.	
25,696	400	.0002	0.	
32,120	500	.0002	0.	
38,544	600	.0004	0.	E=6,250,000 pounds per square inch.
44,968	700	.0006	0.	
51,392	800	.0008	.0001	
57,816	900	.0011	.0001	
64,240	1,000	.0015	.0002	E=3,461,000 pounds per square inch.
70,664	1,100	.0017	.0003	
77,088	1,200	.0021	.0004	
83,512	1,300	.0025	.0007	
89,936	1,400	.0030	.0009	
96,360	1,500	.0035	.0011	
102,784	1,600	.0039	.0013	
109,208	1,700	.0046	.0016	
115,632	1,800	.0055	.0022	
122,056	1,900	.0064	.0025	
128,480	2,000	.0078	.0036	
134,904	2,100	.0090	.0044	
141,328	2,200	.0110	.0057	
147,752	2,300	.....	.....	Ultimate strength.

No. 10845.

Marks, 7/13.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 14 days.
Height, 12″.13.
Sectional area, 8″.09×8″.12=65.69 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,569	100	0.	0.	Initial load.
13,138	200	0.	0.	
19,707	300	0.	0.	
26,276	400	.0001	0.	
32,845	500	.0002	0.	
39,414	600	.0004	0.	E=6,250,000 pounds per square inch.
45,983	700	.0006	0.	
52,552	800	.0008	0.	
59,121	900	.0011	0.	
65,690	1,000	.0014	.0001	E=3,461,000 pounds per square inch.
72,259	1,100	.0018	.0002	
78,828	1,200	.0022	.0004	
85,397	1,300	.0027	.0006	
91,966	1,400	.0033	.0009	
98,535	1,500	.0041	.0012	
105,104	1,600	.0050	.0017	
111,673	1,700	.0069	.0030	
118,242	1,800	.0170	.....	Ultimate strength.

No. 10846

Marks, 7/13.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 14 days.
Height, 11″.97.
Sectional area, 8″.16×8″.03=65.52 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,552	100	0.	0.	Initial load.
13,104	200	0.	0.	
19,656	300	.0002	0.	
26,208	400	.0004	0.	
32,760	500	.0006	0.	
39,312	600	.0008	.0001	E=3,571,000 pounds per square inch.
45,864	700	.0010	.0002	
52,416	800	.0014	.0008	
58,968	900	.0017	.0005	
65,520	1,000	.0022	.0007	E=3,000,000 pounds per square inch.
72,072	1,100	.0029	.0010	
78,624	1,200	.0034	.0013	
85,176	1,300	.0043	.0018	
91,728	1,400	.0053	.0024	
98,280	1,500	.0067	.0032	
104,832	1,600	.0086	.0045	
111,384	1,700	.0105	.0059	
117,936	1,800	.0135	.0082	
123,100	1,879	.....	.....	Ultimate strength.

No. 10849.

Marks, 7/15.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 11 days.
Height, 12″.12.
Sectional area, 8″.06×8″.11=65.37 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,537	100	0.	0.	Initial load.
13,074	200	.0001	0.	
19,611	300	.0002	0.	
26,148	400	.0003	.0001	
32,685	500	.0005	.0001	
39,222	600	.0007	.0002	E=5,000,000 pounds per square inch.
45,759	700	.0011	.0008	
52,296	800	.0015	.0005	
58,833	900	.0020	.0008	
65,370	1,000	.0030	.0014	E=2,812,000 pounds per square inch.
71,907	1,100	.0041	.0022	
78,444	1,200	.0058	.0033	
84,981	1,300	.0080	.0048	
91,518	1,400	.0097	.0062	
98,055	1,500	.0120	.0081	First crack.
117,200	1,793	.....	.....	Ultimate strength.

No. 10,850.

Marks, 7/15.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 12 days.
Height, 12″.14.
Sectional area, 8″.10×8″.09=65.53 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,553	100	0.	0.	Initial load.
13,106	200	.0001	0.	
19,659	300	.0002	0.	
26,212	400	.0003	0.	
32,765	500	.0004	0.	
39,318	600	.0006	.0001	E=5,000,000 pounds per square inch.
45,871	700	.0008	.0001	
52,424	800	.0010	.0001	
58,977	900	.0012	.0001	
65,530	1,000	.0014	.0001	E=3,461,000 pounds per square inch.
72,083	1,100	.0016	.0002	
78,636	1,200	.0018	.0002	
85,189	1,300	.0023	.0002	
91,742	1,400	.0032	.0003	
98,295	1,500	.0045	.0009	First crack.
101,900	1,555	.....	.....	Ultimate strength.

No. 10,853.

Marks, 7/20.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 6 days.
Height, 12″.18.
Sectional area, 8″.01×8″.05=64.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,448	100	0.	0.	Initial load.
12,896	200	0.	0.	
19,344	300	.0001	0.	
25,792	400	.0002	0.	
32,240	500	.0006	0.	
38,688	600	.0013	.0008	E=2,500,000 pounds per square inch.
45,136	700	.0019	.0006	
51,584	800	.0032	.0013	
58,032	900	.0058	.0026	
64,480	1,000	.0094	.0091	First crack.
68,450	1,062	.....	.....	Ultimate strength.

No. 10,854.

Marks, 7/20.
Composition: Alsen cement, 1; sand, 2; broken stone, 4.
Age, 6 days.
Height, 12″.10.
Sectional area, 8″.02×8″.07=64.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total,	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6,472	100	0.	0.	Initial load.
12,944	200	0.	0.	
19,416	300	.0001	0.	
25,888	400	.0003	0.	
32,360	500	.0006	.0001	
38,832	600	.0009	.0001	E=3,125,000 pounds per square inch.
45,304	700	.0015	.0004	
51,776	800	.0023	.0009	
58,248	900	.0033	.0015	
64,720	1,000	.0049	.0025	E=1,875,000 pounds per square inch.
71,192	1,100	.0076	.0043	First crack.
77,664	1,200	.0106	.0068	
83,700	1,293	.....	.....	Ultimate strength.

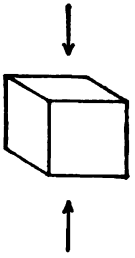
"YAMMERTHAL FLINT" LIMESTONE

FROM

BUFFALO, NEW YORK.

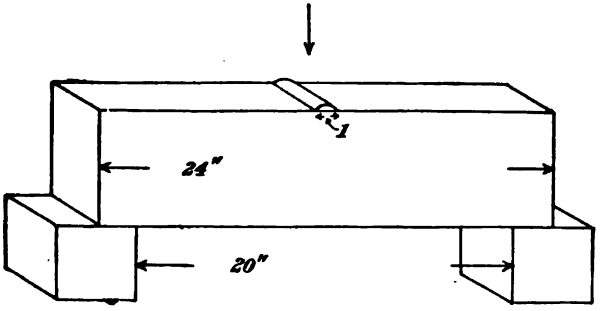
847

COMPRESSION TESTS.



No. of test.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
	Height.	Compressed surface.				Total.	Per square inch.
	Inches.	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*
10265	4.06	4.05	4.05	16.40	361,000	474,800	28,951
10266	4.08	4.05	4.04	16.36	178,000	302,680	18,496

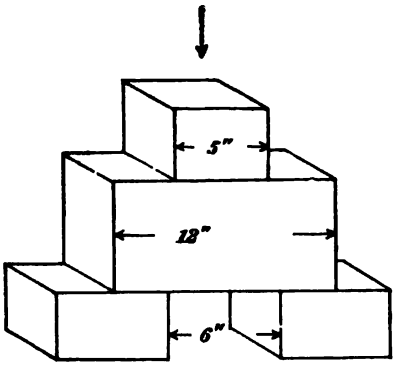
TRANSVERSE TESTS.



Stones supported at ends 20″ apart and loaded at the middle over a length of 1″.

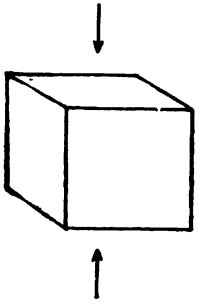
No. of test.	Dimensions.		Ultimate strength.	
	Breadth.	Depth.	Total.	Modulus of rupture, R.
	Inches.	*Inches.*	*Pounds.*	*Pounds.*
10261	4.04	6.04	6,760	1,376
10262	4.09	6.06	10,010	2,000

SHEARING TESTS.



No. of test.	Shearing dimensions.	Shearing area.	Shearing strength.	
			Total.	Per square inch.
	Inches.	*Sq. inches.*	*Pounds.*	*Pounds.*
10263	4.06×6.04×2	49.04	123,500	2,518
10264	4.04×6.05×2	48.88	84,800	1,735

COMPRESSION TEST OF RED GRANITE.



Sample sawed out of a larger block and faces rubbed flat.

No. of test.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
	Height.	Compressed surface.				Total.	Per square inch.
	Inches.	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*
9622	4.03	4.00	4.01	16.04	444,000	459,500	28,647

Pyramidal fracture.

Cement Briquettes.

BEACH'S ROSENDALE CEMENT.

BRIQUETTES SET IN AIR 24 HOURS.

No. of test.	Marks.	Dimensions.		Sectional area.	Tensile strength.		Fineness. Residue on sieves.	
		Width.	Thickness.		Total.	Per square inch.	80-mesh.	100-mesh.
		Inches.	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*
9548	1	1.01	1.00	1.01	119	118	12.0	12.5
		1.01	1.02	1.03	155	151		
		1.02	1.01	1.03	120	116		
9549	2	1.02	1.00	1.02	129	126	19.1	19.1
		1.02	1.00	1.02	92	90		
		1.02	1.00	1.02	120	118		
9550	3	1.02	1.00	1.02	130	127	18.7	18.8
		1.01	1.01	1.02	126	124		
		1.02	1.00	1.02	116	114		
9551	4	1.02	1.00	1.02	137	134	16.5	17.0
		1.02	1.00	1.02	109	107		
		1.02	1.00	1.02	115	113		
9552	5	1.02	1.00	1.02	145	142	10.5	11.9
		1.02	1.00	1.02	158	155		
		1.02	1.00	1.02	148	145		
9553	6	1.02	1.00	1.02	97	96	16.2	17.0
		1.02	1.00	1.02	70	69		
		1.02	1.00	1.02	85	83		
9554	7	1.02	1.01	1.03	86	83	19.5	20.0
		1.02	1.01	1.03	128	124		
		1.01	1.01	1.02	136	133		
9555	8	1.02	.98	1.00	124	124	18.5	18.7
		1.02	1.00	1.02	138	135		
		1.02	1.00	1.02	154	151		
9556	9	1.01	1.00	1.01	98	97	11.0	12.0
		1.02	1.00	1.02	146	143		
		1.01	.99	1.00	152	152		
9557	10	1.02	1.00	1.02	156	152	14.5	15.4
		1.02	1.00	1.02	141	138		
		1.01	1.00	1.01	174	172		
9558	11	1.02	1.01	1.03	128	124	20.5	20.8
		1.02	1.00	1.02	121	119		
		1.02	1.00	1.02	137	134		
9559	12	1.02	1.00	1.02	150	147	16.0	16.5
		1.02	.98	1.00	155	155		
		1.02	1.00	1.02	142	139		
9560	13	1.01	1.01	1.02	154	152	21.0	21.5
		1.01	1.00	1.01	151	149		
		1.02	1.00	1.02	132	129		

BRIQUETTES SET IN AIR 2 HOURS, AND IN WATER 22 HOURS.

9563	1	1.00	.98	.98	70	71	.....	.....
9564	2	1.01	.98	.99	79	80	.....	.....
9565	3	1.01	1.00	1.01	73	72	.....	.....
9566	4	1.01	.99	1.00	73	73	.....	.....
9567	6	1.01	1.00	1.01	63	62	.....	.....
9568	8	1.01	.99	1.00	79	79	.....	.....
9569	9	1.01	1.00	1.01	63	62	.....	.....
9570	10	1.02	1.00	1.02	62	61	.....	.....
9571	11	1.02	1.00	1.02	66	65	.....	.....
9572	12	1.02	1.00	1.02	79	77	.....	.....

ENDURANCE OF ROTATING SHAFTS.

Shafts turned down from bars $1\frac{1}{4}''$ diameter.
Diameter $1''$. Speed of rotation, 500 per minute.
Length between end supports, $33''$.
Loaded over $4''$ length at middle.

No. of test.	Marks.	Carbon.	Maximum fiber stress per square inch.	Total number of rotations.	Treatment of steel.	Remarks.
304	1–C–2	0.161	40,000	453,700	Untreated, hot rolled bar.	Ruptured.
307	2–C–2	0.172	40,000	366,500	.....do.....	Do.
306	3–C–2	0.341	40,000	535,200	.....do.....	Do.
309	7–B–1	0.733	40,000	56,518,910	.....do.....	Not ruptured.
310	9–C–2	0.824	40,000	65,679,000	.....do.....	Do.
308	11–C–3	1.094	40,000	50,214,720	.....do.....	Do.
311	.7×1	0.26	40,000	27,546,930	Annealed at low heat....	Ruptured.
317	7×1	0.26	40,000	36,502,480	Oil tempered and annealed at high heat.	Not ruptured.

IMPACT TESTS.

IMPACT TESTS.

Impact tests were inaugurated upon the softer metals under compression loads, using flat-ended cylindrical specimens. They rested upon an anvil having a hardened steel face, and were struck by blows from a falling ram of 77 pounds weight, which also had a hardened steel hammer face.

The anvil and cast-iron chabotte, which are securely bolted together, have a total weight of about 30,000 pounds, and these rest upon a cast-iron base, which in turn weighs about 30,000 pounds.

Results on lead form the larger part of the experiments here reported, a number of tests having been made upon tin, zinc, and copper; all subjected to impact under striking velocities ranging from 1.64 feet per second for a drop of $\frac{1}{8}$″ up to 19.79 feet per second for a drop of 73″.

The details of the experiments are followed by a number of diagrams showing certain series of the tests.

Rod lead was generally used on account of its uniformity in structure and resisting qualities. This metal was cast in a cylinder $7\frac{9}{16}$″ diameter and forced through an aperture at the lower end, the size of the rod, by means of a plunger actuated by hydraulic pressure, in the usual manner of making lead pipe. The coarser granular structure found in the casting in this manner is drawn down to a finer granulation, much elongated, in the rod, and possessing greater uniformity in resistance than found in small castings, in which different casting temperatures and conditions of cooling are usually experienced.

Table 1 gives the results in a series of 73 specimens, 1″ diameter and 2″ in height each, which were subjected to one blow each of the ram, the heights ranging from 1″ to 73″. This was followed by giving each specimen an additional blow of 5″ drop, and afterwards a blow from such additional height as gave an aggregate of 79″ for the three blows.

Table 2 gives results on specimens 1″ diameter and $1\frac{1}{2}$″ in height;

Table 3, results on specimens of the same diameter but 1″ in height; and

Table 4, specimens 0.799″ diameter by 1″.6 in height.

In Table 5 are the results on one specimen subjected to successive blows 1″ each, aggregating 73″ in the series.

Table 6 shows similarly the results on one specimen in which each blow was from a height of 2″, while

Table 7 has the results of six different specimens, which were subjected to blows of 6″ each, and from greater heights.

Tables 9 and 10 are on individual specimens, cylinders 1″ diameter by $1\frac{1}{2}$″ high, and 0″.799 diameter by 1″.6 high respectively. On Table 10 are shown results in which intervals of rest have occurred between blows.

The results on samples taken directly from the pig are found in Table 11.

Diagrams 1, 2, and 3 are based upon the results found in tables 1, 2, 3, 5, 6, and 7.

The relative compression of cylinders of the same diameter, but of different heights, may be seen upon inspection of diagram 1.

In diagram 2 are shown the curves resulting from the first series of

single blows, additional blows of 5″ each, and after an aggregate of 79″ in height had been received by each specimen. The increased resistance of the metal against higher striking velocities of the ram is clearly shown by comparing the relative effect of the 5″ blows with the curve of single blows for greater heights. The curve after 79″ aggregate drop further shows the same result, and since the halves of this curve are fairly alike it appears that about the same result is reached when the order of the blows was 1″, 5″, and 73″, or when this order was reversed.

More conspicuous still are the results plotted in diagram 3 of the relative resistance of the lead under different striking velocities of the ram. Comparing, as an example, the effect of three blows of 12″ each with the corresponding decrement of the specimen under a single blow and it will be found to correspond with a single blow of 53″. This difference in resistance is evidently encountered in the early stages of compression, when the metal is being displaced at the higher velocities, and is an index of the resistance encountered in the single blow having a maximum velocity of 16.86 feet per second against a maximum velocity of 8.02 feet per second in the 12″ blows. In the latter stages of compression, with the velocity of the ram greatly retarded, the resistance of the metal against flow approaches a condition more nearly identical in each experiment.

The curves of decrements of heights under the lower striking velocities of the 6″, 2″, and 1″ blows show less variation in the resistance of the metal. A series of ½″ blows, the details of which are not recorded in this report, shows somewhat less resistance encountered than with 1″ blows; that is, the decrements in heights are greater in the case of the ½″ blows for equal aggregate blows. From all of which it appears that the resistance of flow increases with the increase of velocity of impact over the range of velocities covered by these experiments.

At the foot of Table 7 are the measurements of concentric circles on the ends of a specimen and the distance apart of rings on the cylindrical surface laid off before impact and measured again after impact. This was done to judge of the paths followed by the parts of the specimen during impact. The enlargement of each of the end circles indicates the projection of metal into these surfaces from points below, and the shortened surface sections show that some folding over occurred near the circumference. From the sinuous shape assumed by these circular lines after impact, it was evident that flow did not take place uniformly throughout the mass, but was modified by the crystalline structure of the lead. As the specimens were reduced in height, there was formed a bright halo of metal on the ends at the circumference, reaching a width of 0″.2 ±, and which was attributed to radial flow of the lead over the surfaces of the anvil and the hammer face of the ram. This frictional resistance must necessarily absorb some of the energy of the falling weight. Still, a succession of short blows caused the specimen to assume a more decided barrel shape than a single blow from a height equal to the aggregate of the shorter ones.

In those experiments in which single blows of gradually increasing heights were used, the different specimens gradually assumed a truncated conoidal shape, in which the larger diameter was at the bottom end, that resting upon the anvil. These remarks all refer to the behavior of the lead cylinders.

In carrying out experiments where a number of blows were given the same specimen, some irregularity in the behavior of the lead was due to intervals of rest occurring during the progress of the series. Special tests on this feature are recorded in Table 10. In the second experiment it will be seen that the blows immediately followed each other until four had been delivered, the successive decrements in height, which began with 0″.059, falling in the meantime to 0″.031. Then followed an interval of rest of 22 hours, after which the next decrement of height rose to 0″.050, and was followed by decrements of 0″.035 and 0″.030 under the additional blows immediately thereafter given. Another rest followed, now of 30 hours, whereupon the decrement of height was 0″.054. Not in all cases were the differences in the magnitude of the decrements so marked as these referred to, the rest following the ninth blow forming an exception in the present experiment.

It will be further observed that when rests followed each sucessive blow the decrements of height did not attain the magnitude found in those cases in which several blows preceded the interval of rest. The first experiment in the table shows this.

A statement consistent with the present data would be as follows: That lead may be brought into a temporary state of higher resistance, and that during an interval of rest this temporary state of increased rigidity may be recovered from. This state of increased rigidity must, of course, first be entered upon to admit of subsequent relaxation.

In the preliminary tests of lead cylinders from metals cast under different rates of cooling it appeared that the more slowly cooled samples gave somewhat less resistance to impact than rapidly cooled metal. The slowly cooled samples were much the coarser grained.

Specimens from the pig, when compressed normally to the longitudinal axes of the crystals of the metal, flowed most in the direction of the length of the crystals. Specimen H, Table 11, after a drop of 60″, elongated in the direction of the length of the crystals from 1′ (the original diameter) to 2″.09 after impact, while in a crosswise direction the final diameter was 1″.07, an increase of 0″.07 in this direction against 1″.09 in the direction of the lengths of the crystals.

This tendency to flow more readily in the direction of the major axes of the crystals may be overcome in a degree by a partial compression under a lighter blow followed by an interval of rest.

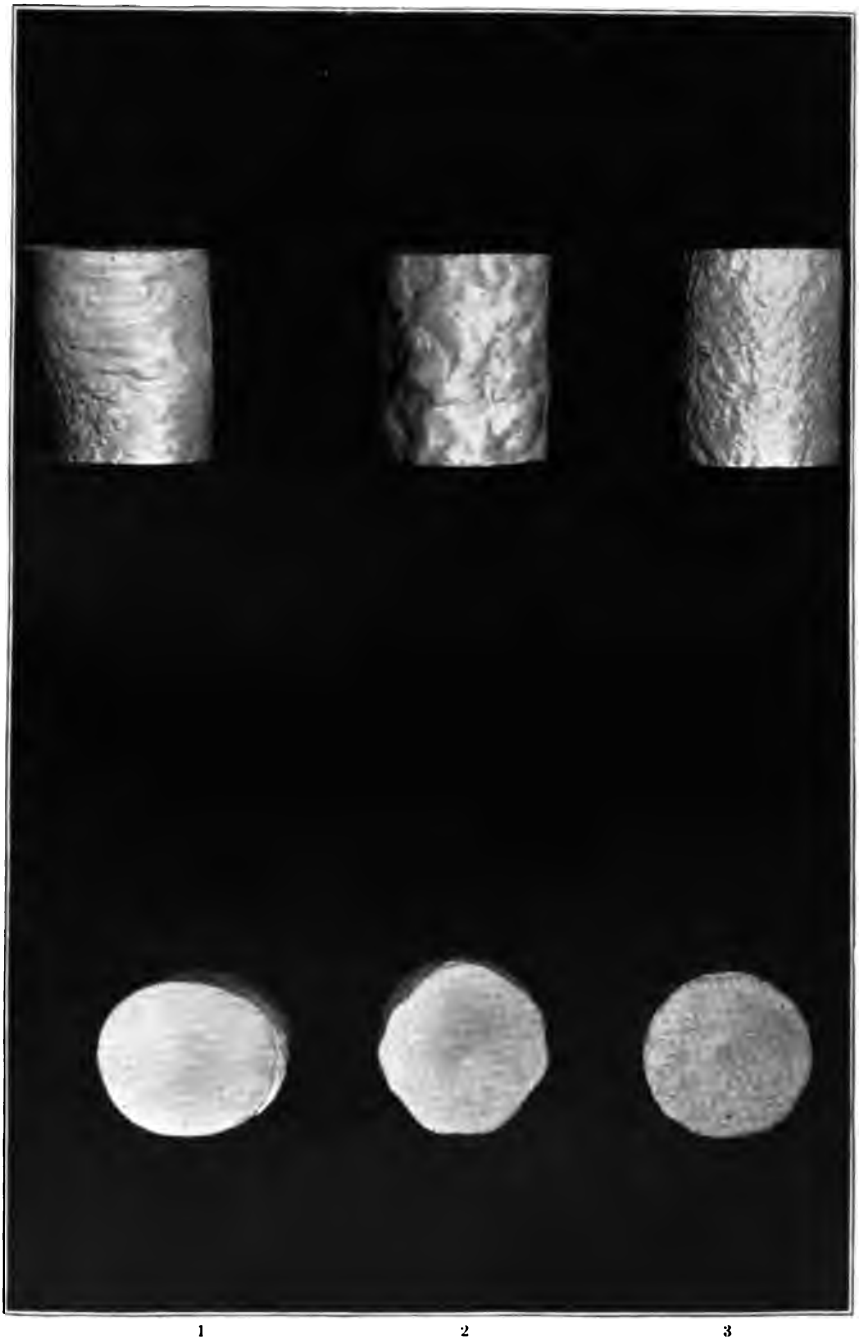
Specimen I was first struck with a blow of 30″ height, and then after four days' rest with another of the same height. After the first blow the major and minor diameters were 1″.54 and 1″.06, respectively; after the second they were 1″.80 and 1″.30, a decided gain in the crosswise direction of the crystals by the second blow. Specimens compressed endwise the crystals more readily retain their cylindrical shape. Specimen C, after a blow of 60″, measured 1″.5 and 1″.3 on two diameters.

Notwithstanding these peculiarities of flow, the decrements of height are not decidedly unlike, whether the specimens are compressed longitudinally or radially with reference to the location of the specimen in the pig.

Coming to the behavior of tin, shown in Table 12, the decrements of height are greater with specimens compressed endwise the crystals.

Radial specimen 17, under 50″ height of drop, compressed 0″.455 against 0″.355 for specimen 5, which was taken out of the ingot in a longitudinal direction. The photographs show the radial specimens to have their axes parallel to the length of the crystals of the metal.

Tin and zinc both differ from lead in respect to the direction in which lateral flow most readily takes place. In these metals the greater flow takes place perpendicular to the longitudinal axes of the crystals. Tin recast from the ingot in an iron mold gives greater resistance against impact than specimens from the ingot.



APPEARANCE OF LEAD SPECIMENS AFTER IMPACT.

1. Specimen from the pig.
2. Specimen from a casting in a magnesia mold.
3. Specimen from a casting in an iron mold.

IMPACT TESTS. LEAD CYLINDERS.

Lead rod from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.

Height of drop.	Height of specimen.		Approximate diameter after impact.	Decrement of height.		Height of drop, second blow.	Height of specimen after impact.	Decrement of height.	Height of drop, third blow.	Height of specimen after impact.	Decrement of height.	
	Initial.	After impact.		Total.	Successive.						Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*
1	2.000	1.942	1.02	0.058	0.058	5	1.780	0.162	73	0.864	0.916	1.136
2	1.999	1.902	1.08	.097	.039	5	1.752	.150	72	.858	.894	1.141
3	2.000	1.869	1.04	.131	.034	5	1.727	.142	71	.855	.872	1.145
4	1.999	1.840	1.04	.159	.028	5	1.688	.152	70	.842	.846	1.157
5	1.999	1.812	1.05	.187	.029	5	1.649	.163	69	.830	.819	1.169
6	1.999	1.787	1.06	.212	.025	5	1.620	.167	68	.827	.798	1.172
7	1.999	1.763	1.06	.236	.024	5	1.597	.166	67	.819	.778	1.180

IMPACT TESTS. LEAD CYLINDERS—Continued.

Height of drop.	Height of specimen.		Approximate diameter after impact.	Decrement of height.		Height of drop, second blow.	Height of specimen after impact.	Decrement of height.	Height of drop, third blow.	Height of specimen after impact.	Decrement of height.	
	Initial.	After impact.		Total.	Successive.						Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*
8	1.999	1.741	1.07	.258	.022	5	1.575	.166	66	.820	.755	1.179
9	1.999	1.718	1.08	.281	.023	5	1.554	.164	65	.813	.741	1.186
10	1.999	1.697	1.09	.302	.021	5	1.535	.162	64	.811	.724	1.188
11	1.999	1.679	1.10	.320	.018	5	1.518	.161	63	.807	.711	1.192
12	1.999	1.660	1.10	.339	.019	5	1.501	.159	62	.806	.695	1.193
13	1.999	1.641	1.11	.358	.019	5	1.484	.157	61	.804	.680	1.195
14	1.999	1.622	1.12	.377	.019	5	1.466	156	60	.802	.664	1.197
15	1.999	1.605	1.12	.394	.017	5	1.452	.153	59	.799	.653	1.200
16	1.999	1.587	1.13	.412	.018	5	1.435	.152	58	.799	.636	1.200
17	1.998	1.570	1.13	.428	.016	5	1.420	.150	57	.797	.623	1.201
18	1.998	1.554	1.14	.444	.016	5	1.406	.148	56	.796	.610	1.201
19	1.998	1.539	1.14	.459	.015	5	1.393	.146	55	.795	.598	1.203
20	1.999	1.522	1.15	.477	.018	5	1.377	.145	54	.792	.585	1.207
21	1.999	1.507	1.16	.492	.015	5	1.364	.143	53	.789	.575	1.210
22	1.999	1.493	1.17	.506	.014	5	1.352	.141	52	.790	.562	1.209
23	1.999	1.476	1.17	.523	.017	5	1.338	.138	51	.786	.552	1.213
24	1.999	1.463	1.18	.536	.013	5	1.326	.137	50	.788	.538	1.211
25	1.999	1.452	1.18	.547	.011	5	1.316	.136	49	.789	.527	1.210
26	1.999	1.438	1.19	.561	.014	5	1.303	.135	48	.787	.516	1.212
27	1.999	1.424	1.19	.575	.014	5	1.291	.133	47	.786	.505	1.213
28	1.999	1.409	1.20	.590	.015	5	1.279	.130	46	.783	.496	1.216
29	1.998	1.400	1.21	.598	.008	5	1.269	.131	45	.785	.484	1.213
30	1.998	1.382	1.21	.616	.018	5	1.254	.128	44	.783	.471	1.215
31	1.999	1.371	1.22	.628	.012	5	1.243	.128	43	.782	.461	1.217
32	1.999	1.357	1.23	.642	.014	5	1.229	.128	42	.776	.453	1.223
33	1.99[illegible]	1.346	1.23	.653	.011	5	1.220	.126	41	.779	.441	1.220
34	1.99[illegible]	1.330	1.24	.666	.013	5	1.206	.124	40	.778	.428	1.218
35	1.999	1.324	1.25	.675	.009	5	1.201	.123	39	.782	.419	1.217
36	1.999	1.311	1.25	.688	.013	5	1.189	.122	38	.781	.408	1.218
37	1.998	1.301	1.26	.697	.009	5	1.181	.120	37	.782	.399	1.216
38	1.999	1.291	1.26	.708	.011	5	1.171	.120	36	.783	.388	1.216
39	2.001	1.277	1.27	.724	.016	5	1.159	.118	35	.780	.379	1.221
40	1.998	1.265	1.28	.733	.009	5	1.149	.116	34	.779	.370	1.219
41	1.999	1.257	1.28	.742	.009	5	1.141	.116	33	.779	.362	1.220
42	2.000	1.246	1.29	.754	.012	5	1.130	.116	32	.782	.348	1.218
43	1.999	1.235	1.29	.764	.010	5	1.122	.118	31	.782	.340	1.217
44	1.999	1.229	1.30	.770	.006	5	1.116	.113	30	.784	.332	1.215
45	1.999	1.213	1.30	.786	.016	5	1.102	.111	29	.780	.322	1.219

46	1.999	1.208	1.31	.791	.005	5	1.099	.109	28	.787	.312	1.212
47	1.999	1.198	1.31	.806	.015	5	1.083	.110	27	.782	.301	1.217
48	2.000	1.185	1.32	.815	.009	5	1.077	.106	26	.784	.298	1.216
49	1.999	1.175	1.33	.824	.009	5	1.068	.107	25	.785	.288	1.214
50	2.000	1.168	1.33	.832	.008	5	1.062	.106	24	.787	.275	1.213
51	2.000	1.161	1.34	.839	.007	5	1.055	.106	23	.791	.264	1.209
52	1.999	1.150	1.35	.849	.010	5	1.045	.105	22	.790	.255	1.209
53	2.000	1.140	1.35	.860	.011	5	1.035	.104	21	.792	.244	1.208
54	2.000	1.129	1.36	.871	.011	5	1.024	.103	20	.791	.235	1.209
55	1.998	1.123	1.37	.875	.004	5	1.022	.101	19	.790	.227	1.208
56	2.000	1.114	1.37	.886	.011	5	1.013	.101	18	.797	.216	1.208
57	1.999	1.102	1.37	.897	.011	5	1.002	.100	17	.796	.206	1.208
58	2.000	1.092	1.38	.907	.010	5	.996	.097	16	.799	.197	1.201
59	1.999	1.086	1.39	.913	.006	5	.989	.097	15	.802	.187	1.197
60	2.000	1.084	1.39	.916	.003	5	.987	.097	14	.808	.179	1.192
61	2.000	1.072	1.40	.928	.012	5	.976	.096	13	.807	.169	1.193
62	1.999	1.062	1.40	.938	.010	5	.966	.095	12	.808	.158	1.191
63	1.998	1.052	1.41	.946	.008	5	.958	.094	11	.811	.147	1.187
64	1.999	1.046	1.41	.953	.007	5	.952	.094	10	.814	.138	1.185
65	2.000	1.038	1.42	.962	.009	5	.946	.092	9	.818	.128	1.182
66	1.999	1.028	1.42	.971	.009	5	.936	.092	8	.820	.116	1.179
67	1.999	1.021	1.43	.978	.007	5	.930	.091	7	.825	.105	1.174
68	1.999	1.017	1.43	.982	.004	5	.927	.090	6	.832	.095	1.167
69	2.000	1.007	1.44	.996	.011	5	.918	.089	5	.834	.084	1.166
70	1.998	.995	1.45	1.004	.011	5	.906	.089	4	.835	.071	1.164
71	1.999	.990	1.46	1.009	.005	5	.902	.088	3	.844	.058	1.155
72	1.999	.984	1.46	1.015	.006	5	.896	.088	2	.853	.045	1.146
73	2.000	.977	1.47	1.023	.008	5	.890	.087	1	.864	.026	1.136

IMPACT TESTS. LEAD CYLINDERS.

Lead rod from Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.

Height of drop.	Height of specimen.		Approximate diameter after impact.	Decrement of height.		Height of drop, second blow.	Height of specimen after impact.	Decrement of height.		Remarks.
	Initial.	After impact.		Total.	Successive.			Successive.	Total.	
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	
1	1.497	1.444	1.02	.058	.058	5	1.298	.146	.199	
2	1.497	1.408	1.08	.089	.036	5	1.273	.135	.224	
3	1.498	1.377	1.04	.121	.032	5	1.226	.151	.272	
4	1.496	1.349	1.05	.147	.026	5	1.194	.155	.302	
5	1.495	1.324	1.06	.171	.024	5	1.169	.155	.326	
6	1.496	1.308	1.07	.193	.022	5	1.150	.153	.346	
7	1.496	1.288	1.08	.213	.020	5	1.133	.150	.363	
8	1.496	1.262	1.09	.234	.021	5	1.115	.147	.381	
9	1.497	1.243	1.10	.254	.020	5	1.098	.145	.399	
10	1.497	1.225	1.11	.272	.018	5	1.082	.143	.417	
11	1.495	1.207	1.12	.288	.016	5	1.067	.140	.428	
12	1.496	1.191	1.12	.305	.017	5	1.053	.138	.443	
13	1.495	1.174	1.13	.321	.016	5	1.038	.136	.457	

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IMPACT TESTS. LEAD CYLINDERS—Continued.

Height of drop.	Height of specimen.		Aproximate diameter after impact.	Decrement of height.		Height of drop, second blow.	Height of specimen after impact.	Decrement of height.		Remarks.
	Initial.	After impact.		Total.	Successive.			Successive.	Total.	
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	
65	1.493	.662	1.53	.831	.006	5	.591	.071	.902	
66	1.495	.657	1.54	.838	.007	5	.587	.070	.908	
67	1.494	.651	1.55	.843	.005	5	.581	.070	.913	
68	1.492	.640	1.55	.852	.009	5	.572	.068	.920	
69	1.495	.634	1.56	.861	.009	5	.566	.068	.929	
70	1.495	.614	1.57	.881	.020	5	.553	.061	.942	
71	1.494	.621	1.58	.873	—.008	5	.554	.067	.940	
72	1.494	.621	1.58	.873	0.	5	.555	.066	.939	
73	1.495	.611	1.59	.884	.011	5	.546	.065	.949	

IMPACT TESTS. LEAD CYLINDERS.

Lead rod from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.

Height of drop.	Height of specimen.		Approximate diameter after impact.	Decrement of height.	
	Initial.	After impact.		Total.	Successive.
Inches.	*Inch.*	*Inch.*	*Inches.*	*Inch.*	*Inch.*
1	.997	.950	1.04	.047	.047
2	.997	.919	1.04	.078	.031
3	.998	.893	1.07	.105	.027
4	.997	.869	1.08	.128	.023
5	.998	.848	1.10	.150	.022
6	.997	.829	1.11	.168	.018
7	.997	.811	1.12	.186	.018
8	.997	.796	1.13	.201	.015
9	.997	.778	1.15	.219	.018
10	.998	.762	1.16	.236	.017
11	.997	.748	1.17	.249	.013
12	.997	.733	1.18	.264	.015
13	.997	.720	1.20	.277	.013
14	.998	.706	1.21	.293	.016
15	.997	.694	1.22	.303	.010
16	.997	.682	1.23	.315	.012
17	.997	.669	1.24	.328	.013
18	.997	.658	1.24	.339	.011
19	.998	.647	1.25	.351	.012
20	.996	.633	1.26	.363	.012
21	.998	.626	1.27	.372	.009
22	.997	.615	1.29	.382	.010
23	.997	.604	1.30	.393	.011
24	.997	.594	1.31	.403	.010
25	.996	.583	1.32	.413	.010
26	.997	.575	1.33	.422	.009
27	.997	.567	1.34	.430	.008
28	.997	.557	1.35	.440	.010
29	.997	.550	1.36	.447	.007
30	.997	.540	1.38	.457	.010
31	.997	.531	1.39	.466	.009
32	.997	.525	1.40	.472	.006
33	.997	.518	1.41	.479	.007
34	.997	.509	1.42	.488	.009
35	.997	500	1.43	.497	.009
36	.997	.494	1.44	.503	.006
37	.997	.489	1.44	.508	.005
38	.997	.480	1.45	.517	.009
39	.997	.473	1.46	.524	.007
40	.997	.464	1.48	.535	.009
41	.997	.458	1.49	.539	.004
42	.997	.452	1.50	.545	.006
43	.997	.449	1.51	.548	.003
44	.997	.444	1.52	.553	.005
45	.998	.437	1.52	.561	.008
46	.997	.430	1.54	.567	.006
47	.997	.424	1.55	.573	.006
48	.996	.418	1.55	.578	.005
49	.998	.411	1.57	.587	.009
50	.997	.407	1.58	.590	.003
51	.997	.401	1.59	.596	.006
52	.997	.397	1.60	.600	.004

IMPACT TESTS. LEAD CYLINDERS—Continued.

Height of drop.	Height of specimen.		Approximate diameter after impact.	Decrement of height.	
	Initial.	After impact.		Total.	Successive.
Inches.	*Inch.*	*Inch.*	*Inches.*	*Inch.*	*Inch.*
53	.996	.390	1.61	.606	.006
54	.997	.388	1.63	.609	.003
55	.997	.380	1.64	.617	.008
56	.997	.377	1.65	.620	.003
57	.997	.372	1.65	.625	.005
58	.996	.368	1.66	.628	.003
59	.997	.364	1.67	.633	.005
60	.997	.361	1.68	.636	.003
61	.997	.351	1.70	.646	.010
62	.997	.349	1.71	.648	.002
63	.997	.346	1.72	.651	.003
64	.997	.341	1.73	.656	.005
65	.997	.337	1.74	.660	.004
66	.997	.333	1.75	.664	.004
67	.997	.331	1.76	.666	.002
68	.997	.322	1.77	.675	.009
69	.997	.321	1.78	.676	.001
70	.997	.319	1.79	.678	.002
71	.997	.313	1.80	.684	.006
72	.997	.305	1.82	.692	.008
73	.997	.302	1.88	.695	.003

IMPACT TESTS. LEAD CYLINDERS.

Lead from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.

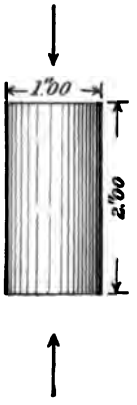
Height of drop.	Height of specimen.		Approximate diameter after impact.	Decrement of height.		Height of drop, second blow.	Height of specimen after impact.	Decrement of height.	
	Initial.	After impact.		Total.	Successive.			Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*
1	1.593	1.575	.....	.078	.078	5	1.315	.200	.278
2	1.594	1.467	.....	.127	.049	5	1.250	.217	.344
3	1.595	1.426	.....	.169	.042	5	1.208	.218	.387
4	1.595	1.389	.....	.206	.037	5	1.178	.211	.417
5	1.594	1.358	.87	.241	.035	5	1.147	.206	.447
6	1.595	1.324	.88	.271	.030	5	1.123	.201	.472
7	1.594	1.293	.89	.301	.030	5	1.097	.196	.497
8	1.595	1.268	.90	.327	.026	5	1.077	.191	.518
9	1.594	1.241	.91	.353	.026	5	1.054	.187	.540
10	1.595	1.219	.92	.376	.023	5	1.036	.183	.559

IMPACT TESTS. LEAD CYLINDERS—Continued.

Height of drop.	Height of specimen.		Approximate diameter after impact.	Decrement of height.		Height of drop, second blow.	Height of specimen after impact.	Decrement of height.	
	Initial.	After impact.		Total.	Successive.			Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*
11	1.594	1.196	.93	.398	.022	5	1.016	.180	.578
12	1.596	1.171	.94	.425	.027	5	.997	.174	.599
13	1.592	1.148	.95	.444	.019	5	.978	.170	.614
14	1.595	1.132	.96	.463	.019	5	.964	.168	.631
15	1.593	1.107	.97	.486	.023	5	.942	.165	.651
16	1.595	1.089	.98	.506	.020	5	.928	.161	.667
17	1.594	1.068	.99	.526	.020	5	.911	.157	.683
18	1.595	1.046	1.00	.549	.023	5	.893	.153	.702
19	1.593	1.029	1.01	.564	.015	5	.878	.151	.715
20	1.593	1.011	1.02	.582	.018	5	.862	.149	.731
21	1.593	.994	1.03	.599	.017	5	.849	.145	.744
22	1.593	.978	1.04	.615	.016	5	.835	.143	.758
23	1.594	.962	1.04	.632	.017	5	.822	.140	.772
24	1.595	.949	1.05	.646	.014	5	.810	.139	.785
25	1.594	.932	1.06	.662	.016	5	.797	.135	.797
26	1.593	.921	1.07	.672	.010	5	.787	.134	.806
27	1.593	.902	1.08	.691	.019	5	.771	.131	.822
28	1.592	.889	1.09	.703	.012	5	.760	.129	.832
29	1.592	.875	1.10	.717	.014	5	.748	.127	.844
30	1.594	.864	1.11	.730	.013	5	.739	.125	.855
31	1.594	.853	1.12	.741	.011	5	.730	.123	.864
32	1.594	.841	1.13	.753	.012	5	.720	.121	.874
33	1.594	.825	1.14	.769	.016	5	.706	.119	.888
34	1.595	.813	1.14	.782	.013	5	.697	.116	.898
35	1.594	.803	1.15	.791	.009	5	.688	.115	.906
36	1.594	.792	1.16	.802	.011	5	.679	.113	.915
37	1.594	.777	1.17	.817	.015	5	.666	.111	.928
38	1.595	.765	1.18	.830	.013	5	.657	.108	.938
39	1.595	.755	1.19	.840	.010	5	.648	.107	.947
40	1.594	.746	1.20	.848	.008	5	.641	.105	.953
41	1.594	.735	1.21	.859	.011	5	.631	.104	.963
42	1.594	.726	1.21	.868	.009	5	.624	.102	.970
43	1.593	.710	1.22	.883	.015	5	.610	.100	.983
44	1.594	.702	1.23	.892	.009	5	.604	.098	.990
45	1.594	.686	1.25	.908	.016	5	.590	.096	1.004
46	1.593	.678	1.25	.915	.007	5	.583	.095	1.010
47	1.594	.675	1.26	.919	.004	5	.580	.095	1.014
48	1.593	.661	1.27	.932	.013	5	.569	.092	1.024
49	1.593	.653	1.28	.940	.008	5	.562	.091	1.031
50	1.594	.644	1.29	.950	.010	5	.555	.089	1.039
51	1.595	.635	1.30	.960	.010	5	.547	.088	1.048
52	1.592	.623	1.31	.969	.009	5	.536	.087	1.056
53	1.593	.615	1.32	.978	.009	5	.530	.085	1.063
54	1.591	.608	1.33	.983	.005	5	.524	.084	1.067
55	1.593	.593	1.34	.995	.012	5	.516	.082	1.077

Impact Tests. Lead Cylinders.

Lead rod from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.



Successive blows of 1″ each given the same specimen.

Height of drop.		Height of specimen.		Decrement of height.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*
1	1	2.000	1.942	.058	.058
1	2	.....	1.908	.089	.097
1	3	.....	1.869	.084	.131
1	4	.....	1.838	.031	.162
1	5	.....	1.811	.027	.189
1	6	.....	1.784	.027	.216
1	7	.....	1.756	.028	.244
1	8	.....	1.729	.027	.271
1	9	.....	1.702	.027	.298
1	10	.....	1.673	.029	.327
1	11	.....	1.644	.029	.356
1	12	.....	1.616	.028	.384
1	13	.....	1.589	.027	.411
1	14	.....	1.562	.027	.438
1	15	.....	1.536	.026	.464
1	16	.....	1.509	.027	.491
1	17	.....	1.484	.025	.516
1	18	.....	1.460	.024	.540
1	19	.....	1.424	.036	.576
1	20	.....	1.398	.026	.602
1	21	.....	1.375	.023	.625
1	22	.....	1.354	.021	.646
1	23	.....	1.334	.020	.666
1	24	.....	1.314	.020	.686
1	25	.....	1.289	.025	.711
1	26	.....	1.264	.025	.736
1	27	.....	1.242	.022	.758
1	28	.....	1.219	.023	.781
1	29	.....	1.200	.019	.800
1	30	.....	1.180	.020	.820
1	31	.....	1.161	.019	.839
1	32	.....	1.142	.019	.858
1	33	.....	1.116	.026	.884
1	34	.....	1.096	.020	.904
1	35	.....	1.078	.018	.922
1	36	.....	1.060	.018	.940
1	37	.....	1.043	.017	.957
1	38	.....	1.025	.018	.975
1	39	.....	1.007	.018	.993
1	40	.....	.990	.017	1.010
1	41	.....	.962	.028	1.038

IMPACT TESTS. LEAD CYLINDERS—Continued.

Height of drop.		Height of specimen.		Decrement of height.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*
1	42	.....	.944	.018	1.056
1	43	.....	.928	.016	1.072
1	44	.....	.914	.014	1.086
1	45	.....	.902	.012	1.098
1	46	.....	.889	.013	1.111
1	47	.....	.876	.013	1.124
1	48	.....	.863	.013	1.137
1	49	.....	.849	.014	1 151
1	50	.....	.833	.016	1 167
1	51	.....	.819	.014	1.181
1	52	.....	.807	.012	1.193
1	53	.....	.795	.012	1.205
1	54	.....	.783	.012	1.217
1	55	.....	.772	.011	1.228
1	56	.....	.759	.013	1.241
1	57	.....	.747	.012	1.253
1	58	.....	.734	.013	1.266
1	59	.....	.723	.011	1.277
1	60	.....	.711	.012	1.289
1	61	.....	.700	.011	1.300
1	62	.....	.690	.010	1.310
1	63	.....	.680	.010	1.320
1	64	.....	.669	.011	1.331
1	65	.....	.659	.010	1.341
1	66	.....	.648	.011	1.352
1	67	.....	.636	.012	1.364
1	68	.....	.625	.011	1.375
1	69	.....	.614	.011	1.386
1	70	.....	.605	.009	1.395
1	71	.....	.597	.008	1.403
1	72	.....	.588	.009	1.412

Impact Tests. Lead Cylinders.

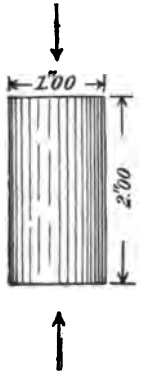
Lead rod from the Boston Lead Manufacturing Company. Weight of ram, 77 pounds.

Successive blows of 2″ each given the same specimen.

Height of drop		Height of specimen.		Decrement of height.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*
2	2	1.999	1.898	.101	.101
2	4	.....	1.835	.063	.164
2	6	.....	1.782	.053	.217
2	8	.....	1.729	.053	.270
2	10	.....	1.665	.064	.334
2	12	.....	1.590	.075	.409
2	14	.....	1.589	.051	.460
2	16	.....	1.494	.045	.505
2	18	.....	1.446	.048	.553
2	20	.....	1.396	.050	.603
2	22	.....	1.349	.047	.650
2	24	.....	1.306	.043	.693
2	26	.....	1.264	.042	.735
2	28	.....	1.219	.045	.780
2	30	.....	1.180	.039	.819
2	32	.....	1.138	.042	.861
2	34	.....	1.091	.047	.908
2	36	.....	1.057	.034	.942
2	38	.....	1.021	.036	.978
2	40	.....	.986	.035	1.013
2	42	.....	.951	.035	1.048
2	44	.....	.921	.030	1.078
2	46	.....	.892	.029	1.107
2	48	.....	.857	.035	1.142
2	50	.....	.830	.027	1.169
2	52	.....	.803	.027	1.196
2	54	.....	.776	.027	1.223
2	56	.....	.750	.026	1.249
2	58	.....	.718	.032	1.281
2	60	.....	.696	.022	1.303
2	62	.....	.674	.022	1.325
2	64	.....	.647	.027	1.352
2	66	.....	.627	.020	1.372
2	68	.....	.608	.019	1.391
2	70	.....	.588	.020	1.411
2	72	.....	.568	.020	1.431

IMPACT TESTS. LEAD CYLINDERS.

Lead rod from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.



Successive blows given individual specimens.

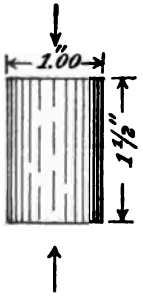
Height of drop.		Height of specimen.		Decrement of height.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
6	6	2.000	1.784	.216	.216
6	12	.....	1.642	.142	.358
6	18	.....	1.488	.154	.512
6	24	.....	1.360	.128	.640
6	30	.....	1.225	.135	.775
6	36	.....	1.112	.113	.888
6	42	.....	1.004	.108	.996
6	48	.....	.906	.098	1.094
6	54	.....	.816	.090	1.184
6	60	.....	.735	.081	1.265
6	66	.....	.659	.076	1.341
6	72	.....	.593	.066	1.407
12	12	2.000	1.654	.346	.346
12	24	.....	1.369	.285	.631
12	36	.....	1.140	.229	.860
12	48	.....	.952	.188	1.048
12	60	.....	.797	.155	1.208
12	72	.....	.667	.130	1.333
24	24	2.000	1.458	.542	.542
12	36	.....	1.210	.248	.790
12	48	.....	1.011	.199	.989
12	60	.....	.847	.164	1.158
12	72	.....	.709	.138	1.291
36	36	2.000	1.305	.695	.695
12	48	.....	1.086	.219	.914
12	60	.....	.909	.177	1.091
12	72	.....	.761	.148	1.239
48	48	2.000	1.181	.819	.819
12	60	.....	.984	.197	1.016
12	72	.....	.924	.060	1.076
72	72	2.000	.979	1.021	1.021

The last specimen recorded in this table, before impact, was laid off with concentric circles marked on each end ".25, ".50, and ".75 diameters, respectively, and on the cylindrical surface sections ".25 apart

each. After impact these lines measured as follows: End diameters, ".34, ".66, 1".00, and ".36, ".68, 1".02; surface sections, ".11, ".13, ".12, ".13, ".12, " 12, ".11, ".11. The lines were all somewhat sinuous.

IMPACT TESTS. LEAD CYLINDERS.

Lead rod from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.



Successive blows given individual specimens.

Height of drop.		Height of specimen.		Decrement of height.		Remarks.
Successive.	Total.	Initial.	After impact.	Successive.	Total.	
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*	
6	6	1.495	1.299	.196	.196	
6	12	.....	1.143	.156	.352	
6	18	.....	.999	.144	.496	
6	24	.....	.871	.128	.624	
6	30	.....	.759	.112	.736	
6	36	.....	.663	.096	.832	
6	42	.....	.580	.083	.915	
6	48	.....	.508	.072	.987	
6	54	.....	.444	.064	1.051	
6	60	.....	.388	.056	1.107	
6	66	.....	*a*.337	.051	1.158	Expanded beyond the face of the hammer.
6	72	.....	*a*.300	.037	1.195	Do.
12	12	1.494	1.184	.310	.310	
12	24	.....	.941	.243	.553	
12	36	.....	.754	.187	.740	
12	48	.....	.607	.147	.887	
12	60	.....	.489	.118	1.005	
12	72	.....	*a*.395	.094	1.099	Do.
24	24	1.498	1.011	.482	.482	
24	48	.....	.694	.317	.799	
24	72	.....	.487	.207	1.006	

a About.

IMPACT TESTS. LEAD CYLINDERS.

Lead rod from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.

Successive blows of 5″ each given the same specimen.

Height of drop.		Height of specimen.		Decrement of height.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*
5	5	1.593	1.358	.235	.235
5	10	.....	1.156	.202	.437
5	15	.....	.986	.170	.607
5	20	.....	.842	.144	.751
5	25	.....	.720	.122	.873
5	30	.....	.616	.104	.977
5	35	.....	.528	.088	1.065
5	40	.....	.454	.074	1.139
5	45	.....	.396	.058	1.197
5	50	.....	.337	.059	1.256
5	55	.....	.290	.047	1.303

IMPACT TESTS. LEAD CYLINDERS.

Lead rod from the Boston Lead Manufacturing Company.
Weight of ram, 77 pounds.

Successive blows given individual specimens, with intervals of rest between some of the blows.

Height of drop.		Height of specimen.		Decrement of height.		Interval of rest since preceding blow.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.		
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Days.*	*Hours.*
1	1	1.999	1.940	.059	.059	.....	.....
1	2	.....	1.898	.042	.101	.....	2
1	3	.....	1.858	.040	.141	.....	20
1	4	.....	1.823	.035	.176	.....	29
1	5	.....	1.785	.038	.214	.....	24
1	6	.....	1.743	.042	.256	2	18
1	7	.....	1.711	.032	.288	.....	.....
1	8	.....	1.658	.053	.341	4	.....
1	9	.....	1.622	.036	.377	4	.....
1	10	.....	1.592	.030	.407	.....	.....
1	1	1.999	1.940	.059	.059	.....	.....
1	2	.....	1.900	.040	.099	.....	.....
1	3	.....	1.866	.034	.133	.....	.....
1	4	.....	1.835	.031	.164	.....	.....
1	5	.....	1.785	.050	.214	.....	22
1	6	.....	1.750	.035	.249	.....	.....
1	7	.....	1.720	.030	.279	.....	.....
1	8	.....	1.666	.054	.333	.....	30
1	9	.....	1.632	.034	.367	.....	.....
1	10	.....	1.597	.035	.402	.....	24
1	11	.....	1.569	.028	.430	.....	.....
1	12	.....	1.517	.052	.482	2	18
1	13	.....	1.483	.034	.516	4	.....
1	14	.....	1.443	.040	.556	4	.....
1	15	.....	1.415	.028	.584	.....	.....
1	1	1.999	1.939	.060	.060	.....	.....
1	2	.....	1.898	.041	.101	.....	.....
1	3	.....	1.865	.033	.134	.....	.....
1	4	.....	1.834	.031	.165	.....	.....
1	5	.....	1.790	.044	.209	.....	1½
1	6	.....	1.757	.033	.242	.....	.....
1	7	.....	1.727	.030	.272	.....	.....
1	8	.....	1.700	.027	.299	.....	.....
1	9	.....	1.644	.056	.355	.....	20
1	10	.....	1.610	.034	.389	.....	.....
1	11	.....	1.581	.029	.418	.....	.....
1	12	.....	1.529	.052	.470	.....	30
1	13	.....	1.498	.031	.501	.....	.....
1	14	.....	1.464	.034	.535	.....	24
1	15	.....	1.438	.026	.561	.....	.....
1	16	.....	1.391	.047	.608	2	18
1	17	.....	1.359	.032	.640	4	.....
1	18	.....	1.323	.036	.676	4	.....

CROSS SECTION OF A PIG OF LEAD, SHOWING THE CRYSTALLINE STRUCTURE.

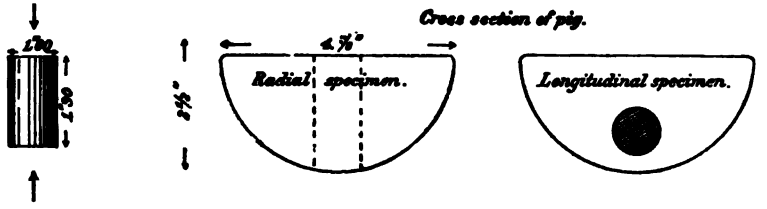
NOTE.—The parallel lines across the photograph were made by the tool in machining.

IMPACT TESTS. LEAD CYLINDERS—Continued.

Height of drop.		Height of specimen.		Decrement of height.		Interval of rest since preceding blow.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.		
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Days.*	*Hours.*
1	1	2.001	1.940	.061	.061	.....	.....
1	2	.....	1.895	.045	.106	2	1
1	3	.....	1.857	.038	.144	2	18
1	4	.....	1.819	.038	.182	4	.....
1	5	.....	1.777	.042	.224	4	.....
1	6	.....	1.744	.033	.257	.....	.....
1	1	2.000	1.940	.060	.060	.....	.....
1	2	.....	1.899	.041	.101	.....	.....
1	3	.....	1.865	.034	.135	.....	.....
1	4	.....	1.834	.031	.166	.....	.....
1	5	.....	1.805	.029	.195	.....	.....
1	6	.....	1.777	.028	.223	.....	.....
1	7	.....	1.721	.056	.279	2	1
1	8	.....	1.683	.038	.317	.....	24
1	9	.....	1.652	.031	.348	.....	.....
1	10	.....	1.600	.052	.400	2	18
1	11	.....	1.564	.036	.436	4	.....
1	12	.....	1.524	.040	.476	4	.....
1	18	.....	1.494	.030	.506	.....	.....

When no interval of rest is recorded the blows immediately followed each other.

IMPACT TESTS. LEAD CYLINDERS.



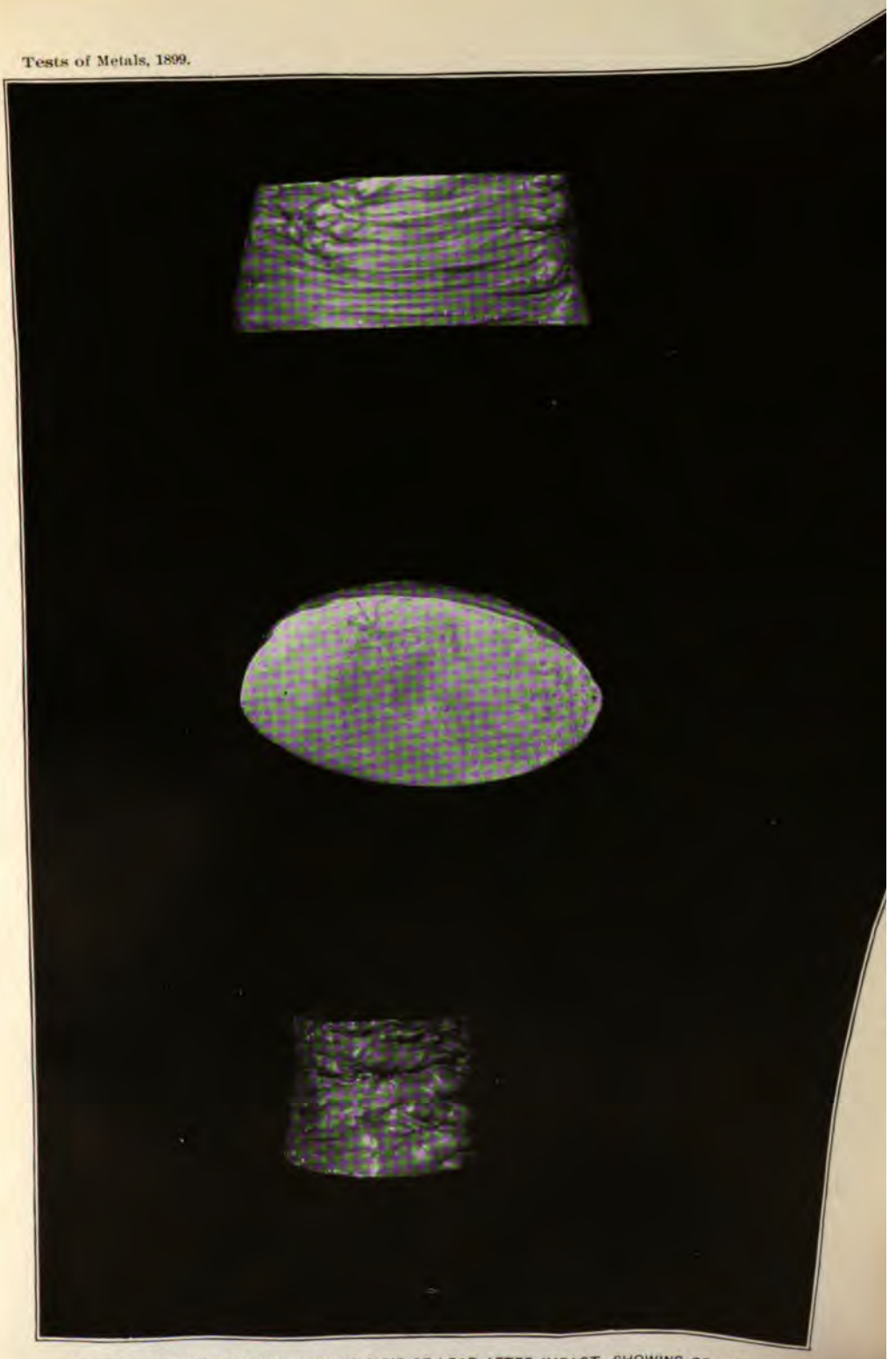
Specimens from a pig branded "Omaha & Grant Refined."
Radial specimens marked A, B, C, and D. Longitudinal specimens marked E, F, G, H, and I.
Weight of ram, 77 pounds.
Single and successive blows given individual specimens.

Mark on specimen.	Height of drop.		Height of specimen.		Decrement of height.		Remarks.
	Successive.	Total.	Initial.	After impact.	Successive.	Total.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	
A....	6	6	1.900	1.633	.267	.267	
	6	12	.....	1.469	.164	.431	
	6	18	.....	1.334	.135	.566	
	6	24	.....	1.214	.120	.686	
	6	30	.....	1.106	.108	.794	
	6	36	.....	.980	.126	.920	Blow delivered after resting 4 days.
	24	60	.....	.706	.274	1.194	

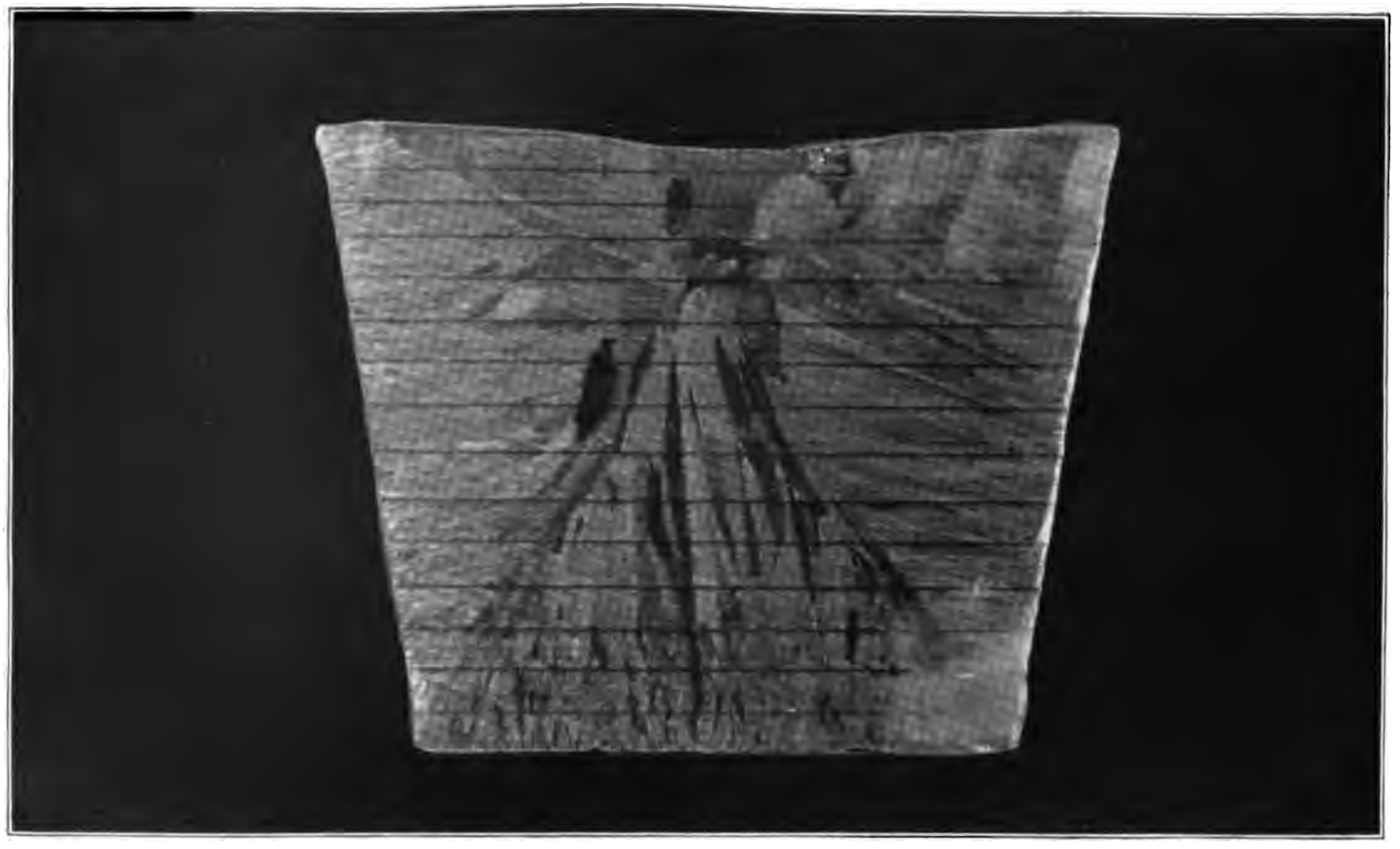
IMPACT TESTS. LEAD CYLINDERS—Continued.

Mark on specimen.	Height of drop.		Height of specimen.		Decrement of height.		Remarks.
	Successive.	Total.	Initial.	After impact.	Successive.	Total.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	
B....	6	6	1.900	1.638	.262	.262	
	6	12	.....	1.477	.161	.423	
	6	18	.....	1.307	.170	.593	Blow delivered after resting 4 days.
	42	60	.....	.797	.510	1.103	
C....	60	60	1.901	.885	1.016	1.016	Approximate diameters after impact.....
D....	30	30	1.901	1.182	.719	.719	Approximate diameter after impact, 1.″16.
	30	60	.....	.804	.878	1.097	Blow delivered after resting 5 days. Approximate diameter after impact, 1.″43.
E....	6	6	1.899	1.633	.266	.266	
	6	12	.....	1.475	.158	.424	
	6	18	.....	1.366	.139	.563	
	6	24	.....	1.220	.116	.679	
	6	30	.....	1.112	.108	.787	Approximate diameters after impact.....
	6	36	.....	.987	.125	.912	Blow delivered after resting 4 days.
	24	60	.....	.718	.269	1.181	Approximate diameters after impact.....
F....	6	6	1.900	1.644	.256	.256	
	6	12	.....	1.487	.157	.413	
	48	60	.....	.854	.633	1.046	Blow delivered after resting 4 days. Approximate diameters after impact.....
G....	6	6	1.899	1.643	.256	.256	Approximate diameters after impact .....
	54	60	.....	.881	.762	1.018	Blow delivered after resting 4 days. Approximate diameters after impact.....
H....	60	60	1.901	.870	1.031	1.031	Approximate diameters after impact .....
I.....	30	30	1.900	1.187	.713	.713	Approximate diameters after impact .....
	30	60	.....	.809	.378	1.091	Blow delivered after resting 4 days. Approximate diameters after impact.....

The maximum diametrical flow occurred in the direction of the length of the crystals of the lead.



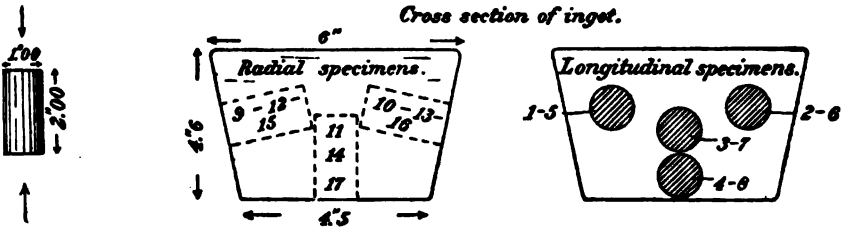
THREE VIEWS OF A SPECIMEN FROM A PIG OF LEAD AFTER IMPACT, SHOWING GREATEST LATERAL FLOW IN THE DIRECTION OF THE LONGITUDINAL AXES OF THE CRYSTALS.



CROSS SECTION OF INGOT OF TIN, SHOWING THE CRYSTALLINE STRUCTURE.

CROSS SECTION OF INGOT OF TIN, SHOWING THE CRYSTALLINE STRUCTURE.

IMPACT TESTS. TIN CYLINDERS.



Specimens from the ingot.
Weight of ram, 77 pounds.
Single and successive blows given individual specimens.

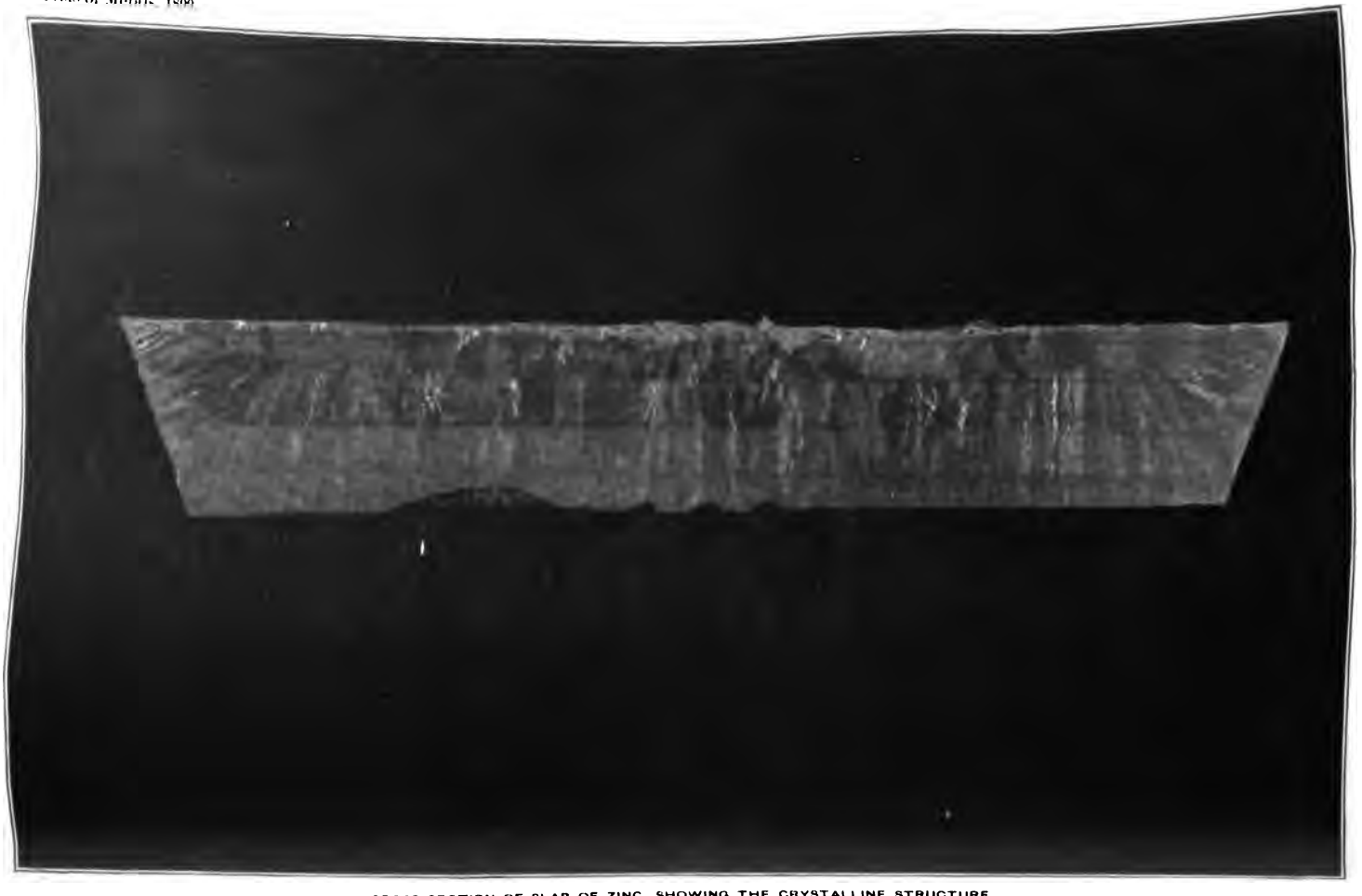
Marks on specimens.	Height of drop.		Height of specimen.		Decrement of height.		Remarks.
	Successive.	Total.	Initial.	After impact.	Successive.	Total.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	
1	5	5	2.001	1.911	.090	.090	
	5	10	.....	1.857	.054	.144	
	5	15	.....	1.809	.048	.192	
	5	20	.....	1.764	.045	.237	
	5	25	.....	1.722	.042	.279	Cross section after impact elliptical, the greater flow occurring perpendicular to the longitudinal axes of the crystals of the tin.
2	25	25	2.001	1.796	.205	.205	Do.
3	25	25	2.001	1.780	.221	.221	
4	25	25	2.001	1.766	.235	.235	
5	50	50	2.001	1.646	.355	.355	
6	72	72	2.002	1.522	.480	.480	
7	72	72	2.001	1.499	.502	.502	Do.
8	72	72	2.001	1.517	.484	.484	
9	25	25	2.001	1.686	.315	.315	
10	5	5	2.001	1.885	.116	.116	
	5	10	.....	1.811	.074	.190	
	5	15	.....	1.747	.064	.254	
	5	20	.....	1.689	.058	.312	
	5	25	.....	1.637	.052	.364	
11	25	25	2.001	1.704	.297	.297	Constricted section near end of specimen after impact.
12	6	6	2.001	1.885	.116	.116	Longitudinal axes of crystals of the tin oblique to the axis of the specimen.
	6	12	.....	1.831	.054	.170	
	6	18	.....	1.785	.046	.216	
13	72	72	2.001	1.438	.563	.563	
14	25	25	2.001	1.700	.301	.301	Constricted section near end of specimen after impact.
15	6	6	2.001	1.876	.125	.125	
	6	12	.....	1.792	.084	.209	
	6	18	.....	1.720	.072	.281	
	6	24	.....	1.655	.065	.346	
	6	30	.....	1.598	.057	.403	
	6	36	.....	1.547	.051	.454	
	6	42	.....	1.502	.045	.499	
	6	48	.....	1.461	.041	.540	
	6	54	.....	1.423	.038	.578	
	6	60	.....	1.388	.035	.613	
	6	66	.....	1.354	.034	.647	
	6	72	.....	1.318	.036	.688	The last blow delivered after an interval of rest of 20 days.
17	50	50	2.001	1.546	.455	.455	Constricted section near end of specimen after impact.

Impact Tests. Tin Cylinders.

Specimens from metal recast from the ingot in an iron mold.
Weight of ram, 77 pounds.
Single and successive blows given individual specimens.

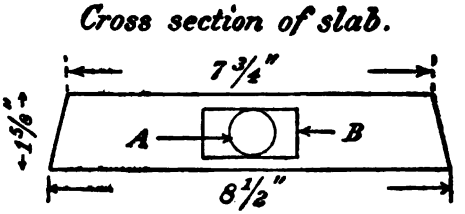
Height of drop.		Height of specimen.		Decrement of height.	
Successive.	Total.	Initial.	After impact.	Successive.	Total.
Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*
72	72	2.000	1.568	.432	.432
12	12	2.001	1.888	.113	.113
12	24	.....	1.805	.083	.196
12	36	.....	1.731	.074	.270
12	48	.....	1.662	.069	.339
12	60	.....	1.599	.063	.402
12	72	.....	1.538	.061	.463
6	6	2.001	1.928	.073	.073
6	12	.....	1.873	.055	.128
6	18	.....	1.825	.048	.176
6	24	.....	1.780	.045	.221
6	30	.....	1.738	.042	.263
6	36	.....	1.697	.041	.304
6	42	.....	1.659	.038	.342
6	48	.....	1.621	.038	.380
6	54	.....	1.586	.035	.415
6	60	.....	1.552	.034	.449
6	66	.....	1.518	.034	.483
6	72	.....	1.486	.032	.515

The last blow of 6″ was delivered after the specimen had rested an interval of 14 days.



CROSS SECTION OF SLAB OF ZINC, SHOWING THE CRYSTALLINE STRUCTURE.

IMPACT TESTS. ZINC CYLINDERS.



Specimens from a cast slab branded "R. Lanyon's Son's Co., Iola, Kans."

Weight of ram, 77 pounds.

Specimen A taken out longitudinally, specimen B in a crosswise direction from the slab.

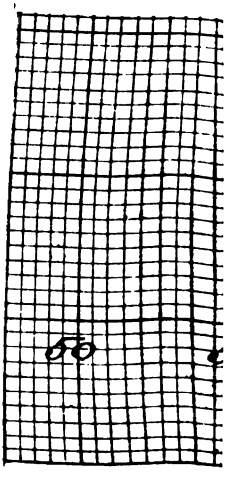
Successive blows given individual specimens.

Marks.	Height of drop.		Height of specimen.		Decrement of height.		Remarks.
	Successive.	Total.	Initial.	After impact.	Successive.	Total.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	
A	6	6	2.000	1.946	.056	.056	
	6	12	.....	1.912	.034	.090	
	6	18	.....	1.884	.028	.118	Minute cracks opened in cylindrical surface.
	6	24	.....	1.858	.026	.144	Specimen slightly elliptic in cross-section dimensions, major diameter perpendicular to the longitudinal axes of the crystals of the zinc.
B	6	6	2.001	1.947	.054	.054	
	6	12	.....	1.915	.032	.086	
	6	18	.....	1.889	.026	.112	Minute cracks opened in cylindrical surface.
	6	24	.....	1.866	.023	.135	

IMPACT TESTS. COPPER CYLINDERS.

Copper cylinders for use in crusher gauges.
Metal purchased at Frankford Arsenal, September, 1896.
Weight of ram, 77 pounds.
See page 399, report of 1898, for table of compression tests.

Height of drop.	Series I.			Series II.			Series III.			Mean decrement of height.
	Height.		Decrement of height.	Height.		Decrement of height.	Height.		Decrement of height.	
	Initial.	After impact.		Initial.	After impact.		Initial.	After impact.		
Inches.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
1	.4991	.4461	.0530	.4991	.4463	.0528	.4990	.4462	.0528	.0529
2	.4992	.4147	.0845	.4998	.4162	.0831	.4988	.4148	.0840	.0839
3	.4992	.3899	.1093	.4989	.3920	.1069	.4991	.3884	.1107	.1090
4	.4991	.3681	.1310	.4993	.3674	.1319	.4992	.3694	.1298	.1309
5	.4998	.3497	.1496	.4998	.3505	.1488	.4994	.3506	.1488	.1491
6	.4990	.3326	.1664	.4995	.3371	.1624	.4992	.3354	.1638	.1642
7	.5994	.3181	.1813	.4992	.3186	.1806	.4993	.3193	.1800	.1806
8	.4990	.3053	.1937	.4988	.3046	.1942	.4991	.3061	.1930	.1936
9	.4994	.2924	.2070	.4992	.2923	.2069	.4988	.2927	.2061	.2067
10	.4990	.2800	.2190	.4998	.2808	.2190	.4986	.2791	.2195	.2192
11	.4995	.2698	.2302	.4990	.2677	.2313	.4993	.2684	.2309	.2308
12	.4996	.2585	.2411	.4994	.2584	.2410	.4992	.2561	.2431	.2417
13	.4999	.2489	.2510	.4992	.2489	.2503	.4997	.2501	.2496	.2503
14	.4994	.2389	.2605	.4995	.2372	.2623	.4995	.2418	.2577	.2602
15	.4997	.2277	.2720	.4998	.2308	.2690	.4992	.2289	.2708	.2704
16	.4997	.2206	.2791	.4993	.2217	.2776	.4997	.2197	.2800	.2789
17	.4997	.2139	.2858	.4994	.2180	.2814	.4995	.2099	.2896	.2856
18	.4996	.2039	.2957	.4992	.2088	.2904	.4995	.2036	.2959	.2940
19	.4995	.1970	.3025	.4990	.1949	.3041	.4996	.2002	.2994	.3020
20	.4992	.1890	.3102	.4995	.1912	.3083	.4990	.1878	.3112	.3098
21	.4992	.1820	.3172	.4998	.1809	.3189	.4997	.1817	.3180	.3180
22	.4998	.1742	.3256	.4992	.1777	.3215	.4995	.1748	.3247	.3289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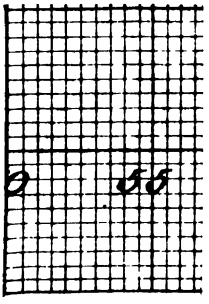
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ARTILLERY HARNESS TRACES.

TENSION TESTS.

WHEEL TRACES FROM ROCK ISLAND ARSENAL.

Length, 53″; width, 2¼″; thickness, 0″.54.
Initial load, 100 pounds.
Elongations measured on full length of trace.

No. of test.	Description.	Elongations under loads in pounds of—									Tensile strength.	Parted.
		500.	1,000.	1,500.	2,000.	2,500.	3,000.	3,500.	4,000.	Maximum.		
		Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	
9592	Stitched trace	2.09	3.85	5.36	6.80	.....	.....	.....	.....	.....	2,427	11″ from end.
9593	.....do	2.10	3.83	5.27	6.69	8.05	.....	.....	.....	8.90	2,755	12½″ from end.
9594	.....do	2.50	4.58	6.18	7.70	9.31	.....	.....	.....	9.52	2,506	12½″ from end.
9595	.....do	2.90	5.22	6.94	8.56	.....	.....	.....	.....	9.10	2,114	12″ from end.

Length, 51½″; width, 2.24″; thickness, 0″.60.

9627	Stitched trace with rawhide strip	.62	2.72	4.53	6.00	7.19	8.60	10.04	11.30	12.10	4,098	At the tree at end of trace.
9628	.....do	.76	3.07	4.83	6.48	7.90	9.10	10.45	.....	10.45	3,500	9″ from end of trace and 2½ from end of joint.

Wheel Traces from The Congdon & Carpenter Company,

Length, 51½″; width, 2¼″; thickness, 0″.53.

No. of test.	Description.	Elongations under loads in pounds of—							Tensile strength.	Parted.
		500.	1,000.	1,500.	2,000.	2,500.	3,000.	Maximum.		
		Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	
9596	No. 1—2¼″. Rawhide full width and around the dees. Two rows rivets. Weight with rivets, 3⅞ pounds; without rivets, 3 pounds.	.87	2.90	4.65	6.07	7.68	9.07	10.65	3,232	13″ from end.
9597	No. 4—2¼″. Narrow piece of rawhide around the dees, and runs down 5 inches. Two rows of rivets. Weight with rivets, 3⅛ pounds; without rivets, 3⅛ pounds.	2.30	4.29	5.98	7.47	.....	.....	8.61	2,221	10″ from end.
9598	No. 6—2¼″. All harness leather throughout. Riveted three rows, center row reversed. Weight with rivets, 3⅛ pounds; without rivets, 3 pounds.	2.57	4.60	6.38	.....	.....	.....	.....	1,600	13″ from end.
9599	No. 8—2¼″. Narrow strip of rawhide extending through the trace and around the dees. Riveted three rows, center row reversed. Weight with rivets, 3⅛ pounds; without rivets, 3⅛ pounds.	1.74	3.46	5.02	6.24	.....	.....	7.51	2,418	12¼″ from end.

Lead Traces from Rock Island Arsenal.

Length, 7′ 11″; width, 1⅞″; thickness, 0″.55.

No. of test.	Description.	Elongations under loads in pounds of—					Tensile strength.	Parted.
		500.	1,000.	1,500.	2,000.	Maximum.		
		Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	
9600	Stitched trace	4.30	7.60	10.42	13.21	14.00	2,148	At middle of length.
9601	.....do	4.13	7.65	10.60	13.46	14.93	2,249	Do.
9602	.....do	4.48	7.92	10.65	13.28	14.48	2,184	Do.
9603	.....do	3.83	7.06	9.87	12.50	15.00	2,397	Do.

Lead Traces from The Congdon & Carpenter Company.

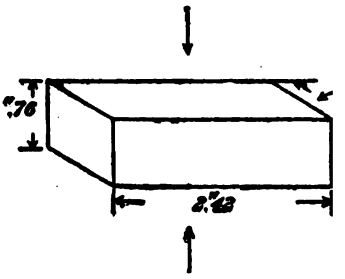
Length, 7′ 8½″ to 7′ 11″; width, 1¾″; thickness, 0″.48, excepting No. 5, which was 0″.45 thick.

No. of test.	Description.	Elongations under loads in pounds of—					Tensile strength.	Parted.
		500.	1,000.	1,500.	2,000.	Maximum.		
		Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	
9604	No. 2—1¼″. **Rawhide** through full width and around the dees. Two rows of rivets. Weight with rivets, 4 5/16 pounds; without rivets, 3 7/16 pounds.	2.42	7.05	10.20	.....	12.80	1,927	31″ from end at joint.
9605	No. 3—1¼″. Narrow piece of rawhide around the dees, and runs down 5 inches. Two rows of rivets. Weight with rivets, 4 1/16 pounds; without rivets, 3 7/16 pounds.	4.27	7.90	11.31	.....	12.72	1,710	28″ from end at joint.
9606	No. 5—1¼″. All harness leather throughout. Three rows of rivets, center row reversed. Weight with rivets, 4 5/16 pounds; without rivets, 3 7/16 pounds.	3.87	7.00	10.18	.....	12.91	1,918	At middle of length.
9607	No. 7—1¼″. Narrow strip of rawhide extending through the trace and around the dees. Riveted three rows, center row reversed. Weight with rivets, 4 1/16 pounds; without rivets, 3 15/16 pounds.	3.63	7.06	9.86	.....	13.40	1,902	28″ from end at joint.

COMPRESSION OF RUBBER.

No. 9608.

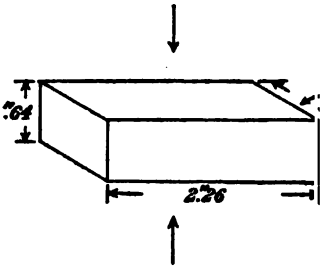
Sample from the Newton Rubber Works.



Applied loads.	Remarks.
Pounds. 2,810	Compressed rubber to ".88 thickness.
	Load removed, sample recovered to ".58 thickness.
19,100	Compressed sample to ".19 thickness.
	Load released, sample recovered to ".84 thickness.

No. 9609.

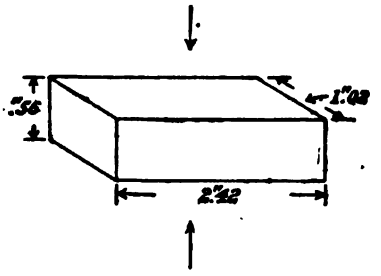
Samples marked $\overset{A.}{\text{H. N. Wayne.}}$



Applied loads.	Remarks.
Pounds. 3,080	Compressed sample to ".32 thickness.
	Load released, sample recovered to ".59 thickness.
25,000	Compressed sample to ".16 thickness.
	Load released, sample recovered to ".28 thickness.

No. 9610.

Sample marked $\overset{B.}{H.\ N.}$ Wayne.



Applied loads.	Remarks.
Pounds. 4,060	Compressed sample to ".28 thickness.
	Load released, sample recovered to ".45 thickness.
34,300	Compressed sample to ".14 thickness.
	Load released, sample recovered to ".30 thickness.

COTTON TARGET CLOTH.

Samples 2" wide and 12" long between jaws of testing machine.

No. of test.	No. of sample.	Submitted by—	Picks per inch.		Elongation in 10".		Tensile strength.	
			Warp.	Filling.	Warp.	Filling.	Warp.	Filling.
					Inches.	*Inches.*	*Pounds.*	*Pounds.*
9630	1	Manhattan Supply Co., New York City	61	62	1.75	1.20	74	72
					1.75	1.15	82	66
9631	2	Rufus P. Clarke, Washington, D. C	62	61	1.70	1.30	69	79
					1.70	1.15	76	59
9632	3	O. Jaffe & Pinkus, New York City	61	60	1.85	1.15	78	78
					1.90	.....	80	81
9633	4	The F. W. McNeal Co., New York City	61	61	1.80	1.35	72	68
					1.80	1.40	79	71
9634	5	J. H. Early & Co., New York City	61	60	1.90	1.10	73	78
					1.87	1.10	74	72
9635	6	Catlin & Co., Boston, Mass	40	37	1.93	1.55	113	125
					1.85	1.55	111	122
9636	7	J. H. Lane, New York City	44	49	1.55	1.45	145	174
					1.60	1.45	146	179
9637	8	John Wanamaker, New York City	54	60	1.85	1.35	99	142
					1.87	1.35	106	140

NUT-LOCKING DEVICE.

SUBMITTED BY KAFADER BROTHERS, FORT BIDWELL, CAL.

The nut-locking device consists of a nut having a notched section on the underside, into which notches a circular spring pawl engages, operating in the manner of a ratchet and pawl movement.

The circular spring pawl is prevented from turning with the nut by reason of lugs engaging in a washer, which washer in turn engages

with the bolt by means of a lug entering a longitudinal groove in the latter.

The device is a positive lock against backing off the nut.

Two bolts were tested, one $\frac{1}{2}''$ diameter and one $\frac{5}{8}''$ diameter. The $\frac{1}{2}''$ bolt and nut submitted for examination was tested by bolting together two iron plates.

The locking device was effective in preventing the nut from being backed off.

Increasing the force used on the wrench in setting up the nut, the nut was tightened until the bolt was twisted; at this time the lug on the washer was sheared off by the force employed. It appears, however, that the locking device has substantially the same strength as the body of the bolt.

The $\frac{5}{8}''$ bolt and device were tested by bolting together two plates, the locking device being found effective.

The test was not carried so far as to cause the destruction of the bolt, the nut finally being removed by unlocking the circular spring pawl by means of the key provided for this purpose.

The nut may be locked at any position where a notch is opposite the spring pawl.

Increasing the number of notches on this nut, or using a bolt with a finer thread, would increase the opportunity for locking the nut with any desired pressure.

CHEMICAL ANALYSES.

CHEMICAL ANALYSES.

BASE RINGS FOR GUN CARRIAGES.

No. of tension test.	Marks.	Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.
		Total	Graphitic.	Combined.				
6217	B R 139 E	2.917	2.249	0.668	0.400	1.528	0.110	0.456
6248	B R 145 E	3.180	2.181	0.999	0.320	1.550	0.134	0.505
6286	B R 154 E	2.454	1.938	0.516	0.260	1.600	0.080	0.405
a 6286	B R 154 E	2.847	1.682	0.665	0.265	0.401	.....	0.387

RACERS FOR GUN CARRIAGES.

6216	R–138 E	2.781	2.236	0.545	0.422	1.280	0.126	0.460
	9–227 2 E	3.190	2.609	0.581	0.458	0.910	0.100	0.309
	9–227 2 E–2	3.163	2.567	0.596	0.451	0.940	0.102	0.285
	9–227 3 E	3.081	2.429	0.652	0.464	1.128	0.100	0.301
	9–227 4 E	3.215	2.463	0.752	0.480	0.915	0.094	0.293

BARREL FOR DYNAMITE GUN.

6252	D G B	2.781	2.557	0.224	0.300	1.950	0.120	0.696

a Chips taken from lump in metal.

CHEMICAL ANALYSES—Continued.

STEELS FROM SPRINGFIELD ARMORY.

No. of tension test.	Description.	Marks.	Carbon.	Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.	Nickel.	Chromium.	Tungsten.	Remarks.
6029	Rifle-barrel steel	B ✪ R	0.716	0.180	0.310	0.010	0.032				1.940	
6102	.....do	B ✪ W	0.680		0.254	0.012	0.032					
6264	.....do	78 R	0.508	1.120	0.190	0.045	0.031					
6265	.....do	78 R R	0.583	0.874	0.190	0.048	0.035					
6263	.....do	78 B R	0.560	1.175	0.310	0.045	0.032					
6262	.....do	78 B	0.568	1.291	0.300	0.042	0.035					
6289	.....do	A I G	0.532	1.160	0.084	0.090	0.120		None.	None.	None.	
6290	.....do	A I R	0.490	1.217	0.084	0.080	0.112		None.	None.	None.	
6291	.....do	A I W	0.580	1.464	0.086	0.090	0.114		None.	None.	None.	
6292	.....do	78 B X	0.562	1.325	0.300	0.045	0.060		None.	None.	None.	
6293	.....do	78 B R X	0.563	1.330	0.310	0.047	0.057		None.	None.	None.	
6294	.....do	78 B R*	0.592	1.317	0.320	0.051	0.055			None.	None.	
6373	.....do	S C L	0.590	1.262	0.275	0.020	0.030					
6374	.....do	S L	0.590	1.305	0.277	0.020	0.034					
6375	.....do	S S S	0.610	1.239	0.257	0.020	0.034					
6399	.....do	S	0.550	1.200	0.300	0.050	0.025	0.024	0.903			
6400	.....do	78	0.600	1.390	0.300	0.070	0.065					
6411	.....do	S E	0.630	1.262	0.290	0 048	0.026					
6414	.....do	S 1 M	0.594	1.105	0.290	0.045	0.030					
6417	.....do	81 R	0.550	1.309	0.255	0.060	0.075					
6419	.....do	81 G	0.480	1.280	0.575	0.058	0.081					
	Receiver steel		0.220	0.760	0.005	0 125	0.052					Model 1894.
	.....do		0.386	0.671	0.195	0.025	0.128					Model 1896.
	.....do		0.381	0.663	0 080	0 082	0.071					Model 1898.
	.....do		0.347	0.570	0.080	0.049	0.054					From fractured receiver.
	.... do		0.338	0.579	0.084	0.051	0.051					Do.
	.....do	38 R F	0.431	0.730	0 086	0.050	0.060					
6401	.....do	R C	0.330	0.620	0.040	0.024	0.075					
6402	.....do	R C F	0.275	0.688	0 040	0.028	0.080					
6415	.....do	R C 1	0.310	0.592	0.088	0.040	0.075					

	Shrapnel		0.147									
5994	Cast steel from bodies of 1,000-pound shell.	5057	0.540	0.698	0.545	0.060	0.064					
5998	.....do	5097	0.500	0.710	0.541	0.090	0.067					
9583	3.6-inch mortar body	M B 7	0.502	0.705	0.250	0.030	0.025					
9584	.....do	M B 11	0.520	0.690	0.270	0.029	0.026					
	.....do	M B 22	0.504	0.601	0.263	0.031	0.027					
	.....do	M B 32	0.500	0.550	0.260	0.030	0.026					
6219	Pivot socket, 6-pounder mount	A 6 / P S 6	0.260	0.645	0.263	0.038	0.037					Cast steel.
6221	.....do	A 8 / P S 6	0.575	1.800	0.517	0.031	0.035					Do.
6275	.....do	A 19 / P S 6	0.340	0.702	0.220	0.045	0.031					Do.
6359	Pivot socket, 15-pounder mount	A 23 / P S 15	0.430	0.377	0.152	0.065	0.040					Do.
6360	.....do	A 24 / P S 15	0.300	0.603	0.225	0.065	0.051					Do.
6362	.....do	A 26 / P S 15	0.492	0.344	0.237	0.068	0.040					Do.
6426	.....do	A 28 / P S 15	0.313	0.501	0.235	0.065	0.035					Do.
6257	Piston rod, 6-pounder mount	A 12 / P R 6	0.909	0.190	0.235	0.018	0.032					
6274	Inner base, 15-pounder mount	A 17 / I B 15	0.272	0.840	0.220	0.043	0.280					
6422	.....do	A 18 / I B 15	0.250	0.580	0.241	0.060	0.040					
6072	Hoop, 3" R. F. gun	A 54 / 3 H B 1	0.578	0.820	0.094	0.047	0.026					
6075	Jacket, 6-pounder R. F. gun	A 54 / 6 J M	0.581	0.845	0.094	0.050	0.026					
6232	Tube, 6" R. F. gun	6 R F 18 T / M T 2 M	0.500	0.685	0.320	0.025	0.040					
6233	Jacket, 6" R. F. gun	6 R F 17 J / M T 1 O	0.530	0.748	0.300	0.016	0.039					

CHEMICAL ANALYSES OF BRONZE, BRASS, AND LUMEN METAL.

Marks.	Description.	Cu.	Sn.	Zn.	Pb.	Al.	Fe.	Sb.	As.	Mn.
1	Bronze cradle for 3"	58.20	0.52	46.88	.....	.....	.....	.....	.....	.....
2	Field carriage	58.83	0.55	45.62	.....	.....	.....	.....	.....	.....
3	.....	54.00	0.50	45.50	.....	.....	.....	.....	.....	.....
A 4 P y 6	Bronze pivot yoke 6-pdr. mount	99.90	9.10	.....	.....	.....	.....	.....	.....	.....
A 12 P y 6	....do	98.69	9.31	.....	.....	.....	.....	.....	.....	.....
.....	Parsons manganese bronze	58.89	0.25	38.06	0.10	0.74	1.54	.....	.....	0.42
35	Cartridge brass	70.02	None.	29.90	.....	.....	.....	.....	.....	.....
C 2	.....do	69.47	None.	30.51	.....	.....	.....	.....	.....	.....
C	.....do	69.00	None.	31.00	.....	.....	.....	.....	.....	.....
.....	Lumen metal	9.10	0.15	82.52	0.50	7.68	.....	None.	None.	.....

Private Tests.

TESTS MADE FOR PRIVATE PARTIES DURING THE FISCAL YEAR ENDED JUNE 30, 1899.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1898.				
July 7	Leather traces	The Congdon & Carpenter Co	Providence	R. I.
13	Cast iron	E. D. Leavitt	Cambridgeport	Mass.
13	Building tile	The H. B. Camp Co	Aultman	Ohio.
15	Steel plate	Mutual Boiler Insurance Co	Boston	Mass.
27	Steel bars	Savage Arms Co	Utica	N. Y.
Aug. 4	.....do	A. Perrin	Brookline	Mass.
11	Cast iron	Geo. H. Lincoln & Co	Boston	Mass.
	Steel bars	Savage Arms Co	Utica	N. Y.
18	Pig iron	Chas. E. Coffin	Muirkirk	Md.
Sept. 10	Bricks	H. W. Ball	Boston	Mass.
	Leather traces	The Congdon & Carpenter Co	Providence	R. I.
16	.....do	.....do	.....do	R. I.
17	Steel bars	Savage Arms Co	Utica	N. Y.
	Manila hawser	Standard Rope and Twine Co	Boston	Mass.
	Angle irons	H. W. Ball	.....do	Mass.
19	Steel-wire rope	The Hazard Manufacturing Co	New York	N. Y.
20	Bricks	H. W. Ball	Boston	Mass.
27	Steel bar	Savage Arms Co	Utica	N. Y.
Oct. 8	Turn-buckles	New England Bolt and Nut Co	Boston	Mass.
14	Steel bars	Savage Arms Co	Utica	N. Y.
20	Bronze	Fore River Engine Co	Weymouth	Mass.
25	Granite	The Ross Granite Co	Worcester	Mass.
Nov. 8	Steel-wire rope	The Hazard Manufacturing Co	New York	N. Y.
9	Copper wire	New York Insulated Wire Co	Wallingford	Conn.
11	Bricks	New York, New Haven and Hartford R. R. Co.	Boston	Mass.
17	Steel bar	Percy M. Blake	Hyde Park	Mass.
21	Tackle blocks	Boston and Lockport Block Co	Boston	Mass.
22	Steel-wire rope	The Hazard Manufacturing Co	New York	N. Y.
Dec. 6	Cast iron	Golding & Co	Boston	Mass.
10	Manila rope	Durand Woodman	New York	N. Y.
12	Steel bars	Savage Arms Co	Utica	N. Y.
14	Sandstone	The West Virginia Co	Philadelphia	Pa.
22	Steel plates	Pennsylvania R. R. Co	Altoona	Pa.
24	Manila rope	Standard Rope and Twine Co	Boston	Mass.
27	Cotton duck	The Manville Co	Providence	R. I.
1899.				
Jan. 11	Steel bars	Savage Arms Co	Utica	N. Y.
	Cotton duck	The Manville Co	Providence	R. I.
14	Limestone	A. P. Kehr	Buffalo	N. Y.
17	Bricks	J. S. Jacobs & Son	Boston	Mass.
24	Leather belting	H. & M. Manufacturing Co	.....do	Mass.
Feb. 2	Limestone	W. J. Sullivan	.....do	Mass.
	Anchor bolts	Boston Elevated Rwy. Co	.....do	Mass.
8	Manila rope	Standard Rope and Twine Co	.....do	Mass.

TESTS MADE FOR PRIVATE PARTIES, ETC.—Continued.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1899.				
Feb. 24	Leather traces	The Congdon & Carpenter Co	Providence	R. I.
25	Manila rope	Durand Woodman	New York	N. Y.
	Rubber belting	Revere Rubber Co	Boston	Mass.
Mar. 1	Steel bar	Marlin Fire Arms Co	New Haven	Conn.
	Sprocket chain	Crompton & Knowles Loom Works	Worcester	Mass.
6	Ulster iron	Charles F. Bellows	Boston	Mass.
11	Wrought iron	Kinsley Iron and Machine Co	Canton	Mass.
	German-silver wire	E. D. Leavitt	Cambridgeport	Mass.
13	Manila rope	Durand Woodman	New York	N. Y.
	Tie plates	Boston and Maine R. R. Co	Boston	Mass.
14	Marble	Adams Marble Co	Adams	Mass.
18	Cast iron	Whittier Machine Co	Boston	Mass.
	Bronze	do	do	Mass.
20	Car couplers	The American Manufacturing Co	New York	N. Y.
	Steel bars	The Marlin Fire Arms Co	New Haven	Conn.
22	Weighing machine.	The Watson & Stillman Co	New York	N. Y.
27	Boiler plate	Social Manufacturing Co	Woonsocket	R. I.
	Rubber belting	Revere Rubber Co	Chelsea	Mass.
Apr. 3	Limestone	R. J. Hendricks	Portland	Oreg.
4	Leather traces	Judson L. Thomson	Waltham	Mass.
5	Wrought-iron plates.	L. Nordland	Boston	Mass.
	Copper-coated plate.	Colley & Co	do	Mass.
10	Aluminum	H. B. Steel	do	Mass.
11	Bricks	Blandford Brick and Tile Co	Worcester	Mass.
13	Cotton yarn	Fearing Hall & Co	Boston	Mass.
15	Steel wire	The American Specialty Manufacturing Co.	Hartford	Conn.
	Steel-wire rope	Carson French Machine Co	Boston	Mass.
	Amalgamated metal.	A. W. Cabot	Stamford	Conn.
21	Steel bars	E. D. Leavitt	Cambridgeport	Mass.
22	Felting cloth	American Felt Co	Boston	Mass.
25	Copper-coated plate.	Colley & Co	do	Mass.
26	Bricks	H. W. Ball	do	Mass.
29	Copper cylinders	The Union Metallic Cartridge Co	Bridgeport	Conn.
May 1	Steel bars	American Hoist and Derrick Co	St. Paul	Minn.
3	Bicycle balls	Waltham Manufacturing Co	Waltham	Mass.
	Cotton duck	Hall, Lincoln & Co	Boston	Mass.
9	Electrically welded steel rails.	Boston Elevated Rwy. Co	do	Mass.
17	Globe valves	The Eynon-Evans Manufacturing Co.	do	Mass.
18	Bricks	Perkins & Betton	do	Mass.
20	Ulster iron	Fuller Bros. & Co	New York	N. Y.
25	Rubber belting	Revere Rubber Co	Boston	Mass.
31	Steel bars	Schenectady Locomotive Works	Schenectady	N. Y.
June 1	Belting	Wm. C. Orth	Boston	Mass.
2	Bicycle balls	Waltham Manufacturing Co	Waltham	Mass.
	Sandstone	J. B. Wirt	Lebanon	Oreg.
	Columns	John Lally	Waltham	Mass.
4	Tackle blocks	Walter Coleman & Sons	Providence	R. I.
8	Copper cylinders	Laflin & Rand Powder Co	Pompton Lakes	N. J.
9	Soft steel	American Ordnance Co	Lynn	Mass.
15	Hemlock wood	Wm. H. Ward	Lowell	Mass.
16	Pig iron	Richmond Iron Works	Richmond Furnace.	Mass.
	Steel bars	Savage Arms Co	Utica	N. Y.
	Globe valves	The Eynon-Evans Manufacturing Co.	Boston	Mass.
17	Manila rope	Durand Woodman	New York	N. Y.
23	Hemlock wood	Wm. H. Ward	Lowell	Mass.
24	Bicycle balls	Waltham Manufacturing Co	Waltham	Mass.
27	Steel bars	Savage Arms Co	Utica	N. Y.

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